# IceBreaker 912

Technical Guide
Rev. 1.0

PENGUIN COMPUTING

# RS300-H8-PS12

# *1U Rackmount Server User Guide*

E8379

First Edition
June 2013

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# Notices

## Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer' s instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING! The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

## Canadian Department of Communications Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This Class A digital apparatus complies with Canadian ICES-003.

## REACH

Complying with the REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulatory framework, we publish the chemical substances in our products at ASUS REACH website at http://csr.asus.com/english/REACH.htm.

# Safety information

## Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

## Operation Safety

- Any mechanical operation on this server must be conducted by certified or experienced engineers.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, ensure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.

This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

Lithium-Ion Battery Warning

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

CD-ROM Drive Safety Warning

**CLASS 1 LASER PRODUCT**

Heavy System

CAUTION! This server system is heavy. Ask for assistance when moving or carrying the system.

**DO NOT** throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

**DO NOT** throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

## Australia statement notice

From 1 January 2012 updated warranties apply to all ASUS products, consistent with the Australian Consumer Law. For the latest product warranty details please visit http://support.asus.com. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

If you require assistance please call ASUS Customer Service 1300 2787 88 or visit us at http://support.asus.com

# About this guide

## Audience

This user guide is intended for system integrators, and experienced users with at least basic knowledge of configuring a server.

## Contents

This guide contains the following parts:

1. **Chapter 1: Product introduction**

   This chapter describes the general features of the server, including sections on front panel and rear panel specifications.

2. **Chapter 2: Hardware setup**

   This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

3. **Chapter 3: Installation options**

   This chapter describes how to install optional components into the barebone server.

4. **Chapter 4: Motherboard information**

   This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.

5. **Chapter 5: BIOS information**

   This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.

6. **Chapter 6: RAID configuration**

   This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

7 **Chapter 7: Driver installation**

   This chapter provides instructions for installing the necessary drivers for different system components.

## Conventions

To ensure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

**DANGER/WARNING:** Information to prevent injury to yourself when trying to complete a task.

**CAUTION:** Information to prevent damage to the components when trying to complete a task.

**IMPORTANT**: Instructions that you MUST follow to complete a task.

**NOTE**: Tips and additional information to help you complete a task.

## Typography

| | |
|---|---|
| **Bold text** | Indicates a menu or an item to select. |
| *Italics* | Used to emphasize a word or a phrase. |
| <Key> | Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.<br>Example: <Enter> means that you must press the Enter or Return key. |
| <Key1>+<Key2+<Key3> | If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).<br>Example: <Ctrl>+<Alt>+<Del> |
| `Command` | Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.<br>Example: At the DOS prompt, type the command line: `format A:/S` |

## References

Refer to the following sources for additional information, and for product and software updates.

1. **ASUS Server Web-based Management (ASWM) user guide**

   This manual tells how to set up and use the proprietary ASUS server management utility.

2. **ASUS websites**

   The ASUS websites worldwide provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information.

# Chapter 1

This chapter describes the general features of the chassis kit. It includes sections on front panel and rear panel specifications.

Product introduction

## 1.1 System package contents

Check your system package for the following items.

| | |
|---|---|
| Model Name | RS300-H8-PS12 |
| Chassis | ASUS 1U Rackmount Chassis |
| Motherboard | ASUS P9D-MH Server Board |
| Component | 1 x Single 400W 80Plus Gold Power Supply<br>4 x Hot-swap 3-in-1 3.5 inch HDD trays<br>1 x SATA Backplane<br>1 x PCIE Riser Card<br>5 x System Fans (40mm x 28mm) |
| Accessories | 1 x RS300-H8-PS12 User's Manual<br>1 x ASWM* User's Guide<br>1 x ASMB7 User's Guide (if ASMB7-iKVM is selected)<br>1 x RS300-H8-PS12 Support DVD<br>1 x ASWM* DVD<br>1 x ASMB7 DVD (if ASMB7-iKVM is selected)<br>3 x Bag of Screws<br>1 x AC Power Cable |
| Optional Items | 1 x CPU Heatsink<br>ASUS ASMB7-iKVM Remote management card<br>1 x Friction Rail Kit |

***ASUS System Web-based Management**

If any of the above items is damaged or missing, contact your retailer.

## 1.2 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 14 characters such as xxS0xxxxxxxxxx shown as the figure below. With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.

## 1.3 System specifications

The ASUS RS300-H8-PS12 is a 1U barebone server system featuring the ASUS P9D-MH Server Board. The server supports Intel® LGA1150 Intel® Xeon® E3-1200 Processor v3 plus other latest technologies through the chipsets onboard.

| Model Name | | RS300-H8-PS12 |
|---|---|---|
| Processor Support / System Bus | | 1 x Socket LGA1150<br>Intel® Xeon® Processor E3-1200 v3 Product Family |
| Core Logic | | Intel® C224 Chipset |
| ASUS Features | Fan Speed Control | ✓ |
| | Rack Ready (Rack and Pedestal dual use) | ✓ |
| | ASWM Enterprise | ✓ |
| Memory | Total Slots | 4 (2 Channels) |
| | Capacity | Maximum up to 32GB |
| | Memory Type | DDR3 1333/1600 ECC UDIMM |
| Expansion Slots (follow SSI Location number) | Total PCI/ PCI-E Slots | 1 |
| | Slot Location 6 | 1 x PCI-E x8 (x4 Gen3 link) |
| Storage | SATA Controller | Intel® C224:<br>- 2 x SATA 3Gb/s ports<br>- 4 x SATA 6Gb/s ports<br>- Intel® RSTe supports software RAID 0, 1, 10, & 5 (Windows only) |
| | SAS Controller | LSI 2308 8-port SAS 6G Controller |
| HDD Bays | I = Internal A or S will be hot-swappable | 4 x 3 in 1 Hot-swap 3.5 inch HDD bays (Serial ATA)<br>2 x Hot-swap SSD bays |
| Networking | LAN | 2 x Intel® I210AT controller + 1 x Management LAN |
| | | 1 x Dual Port Broadcom 57840S 10GbE Chipset |

* Refer to www.asus.com for the complete list of supported CPUs.

*(continued on the next page)*

| Model Name | | RS300-H8-PS12 |
|---|---|---|
| Graphic | VGA | Aspeed AST2300 + 32MB VRAM |
| Onboard I/O Connectors | TPM Header | 1 |
| | PSU Connector | 24-pin ATX power connector<br>8-pin ATX 12V power connector |
| | SATA DOM Power Connector | 4-pin power connector |
| | Management Header | On-board header for optional management card |
| | USB Connector/ Header | 1 x USB 3.0 pin header (up to 2 devices)<br>1 x USB 2.0 pin header (up to 2 devices)<br>1 x USB 2.0 connector (Type A USB socket) |
| | Fan Header | 5 x 4 pin headers |
| | SMBus | 1 |
| | Chassis Intruder | 1 |
| | Front LAN LED | 4 |
| | Serial Port Header | 1 |
| | VGA Header | 1 |
| Rear I/O Connectors | External USB Port | 2 x USB 3.0<br>2 x USB 2.0 |
| | VGA Port | 1 |
| | RJ-45 | 2 x GbE LAN<br>1 x Management LAN |
| | SFP+ | 2 x SFP+ connector |
| | PS/2 KB/ Mouse | 1 |
| Management Solution | Software | ASWM Enterprise |
| | Out of Band Remote Management | Optional ASMB7-iKVM for KVM-over-Internet |
| Dimension | | 615 mm x 444 mm x 43.4 mm |
| Net Weight Kg (CPU, DRAM, and HDD not included) | | 19 Kg |
| Power Supply | | Single 400W 80Plus Gold Power Supply<br>Rating: 100-240Vac, 6.3A 60-50Hz, Class 1 |
| Environment | | Operation temperature:<br>10°C – 40°C<br>Non operation temperature:<br>-40°C – 70°C<br>Non operation humidity:<br>20% – 90% (Non condensing) |

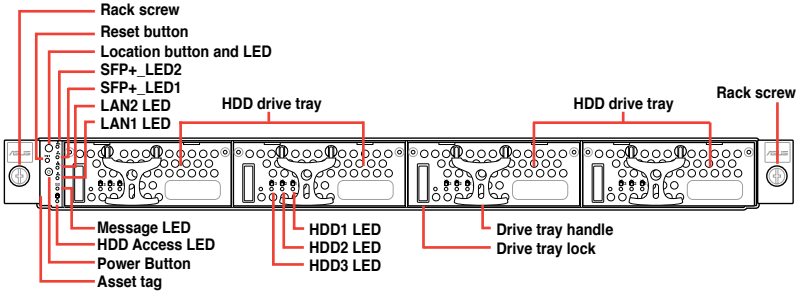
Specifications are subject to change without notice.

## 1.4 Front panel features

The front panel of the RS300-H8-PS12 features a simple yet compact design with the four 3-in-1 HDD trays with hot-swap support and I/O boards conveniently located on the front panel for easy access.

The HDD trays's modular design allows the server to support tool-less installation of up to 12 3.5-inch Serial ATA HDDs.

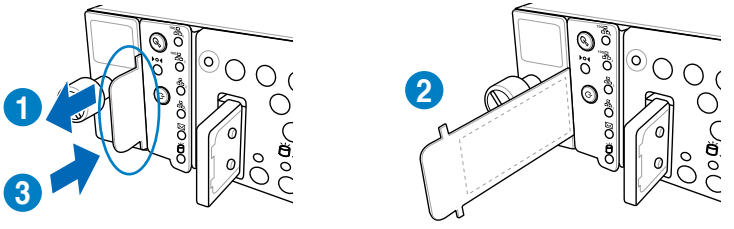
Refer to section **1.7.1 Front panel LEDs** for the LED descriptions.




Turn off the system power and detach the power supply before removing or replacing any system component.

### Asset tag

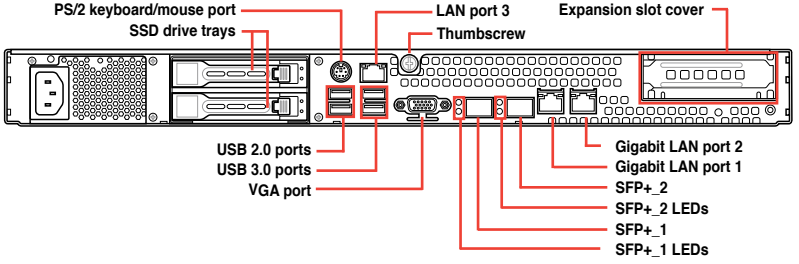
The Asset tag is a small polyester film or foil that is located in the left side of the server's front panel that allows you to log important information about the server such as asset barcode or serial number. The Asset tag is useful in asset tracking and inventory management.



## 1.5 Rear panel features

The rear panel of RS300-H8-PS12 includes the hot-swap SSD trays, expansion slots, SFP+ 10G ports, the rear I/O ports, and the system power socket.

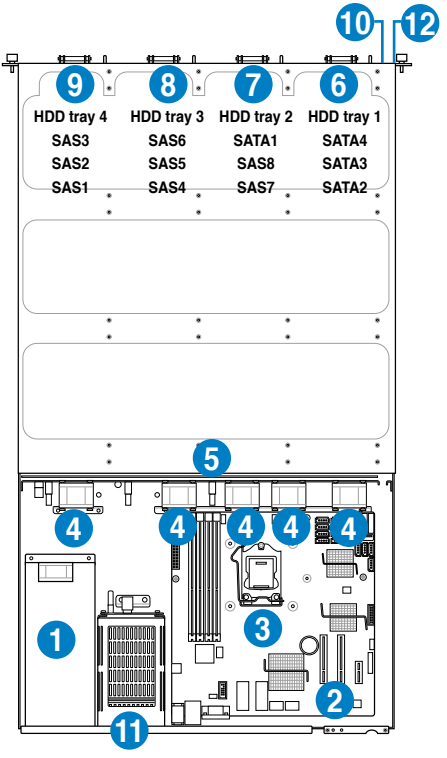
The ports for the USB, VGA, and Gigabit LANs do not appear on the rear panel if the motherboard is not present.




The LAN port 3 is for ASUS ASMB7-iKVM controller card only.

## 1.6 Internal features

The barebone server includes the basic components as shown.




1. Power supply
2. PCI Express slot Riser Card
3. ASUS P9D-MH Server Boards
4. System fans
5. SATA backplane (hidden)
6. HDD tray 1—Connect to SATA2/SATA3/SATA4 port
7. HDD tray 2—Connect to SAS7/SAS8/SATA1 port
8. HDD tray 3—Connect to SAS4/SAS5/SAS6 port
9. HDD tray 4—Connect to SAS1/SAS2/SAS3 port
10. Front I/O boards (hidden)
11. SSD bay
12. Asset Tag (hidden)

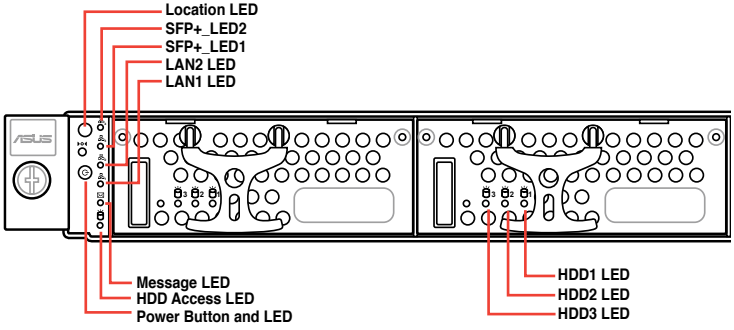
Turn off the system power and detach the power supply before removing or replacing any system component.

The barebone server does not include a floppy disk drive drive. Connect a USB floppy disk drive to any of the USB ports on the front or rear panel if you need to use a floppy disk.

*WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

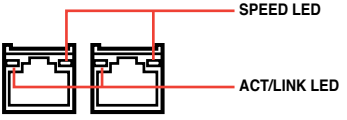
## 1.7 LED information

### 1.7.1 Front panel LEDs



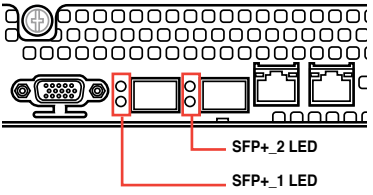

| LED | Icon | Display status | Description |
|---|---|---|---|
| Power LED | | ON | System power ON. |
| Message LED | | OFF | System is normal; no incoming event. |
| | | ON | 1. Without ASMB7-iKVM installed: CPU over-heated<br>2. With ASMB7-iKVM installed: a hardware monitor event is indicated. |
| LAN LEDs | | OFF | No LAN connection. |
| | | Blinking | LAN is transmitting or receiving data. |
| | | ON | LAN connection is present. |
| Location LED | | ON | Location button is pressed. |
| | | OFF | Normal status.<br>(Press the Location button again to turn off.) |
| SFP+_LED1/ SFP+_LED2 | | Amber | LAN connection of 1 Gbps is present. |
| | | Green | LAN connection of 10 Gbps (Green) is present. |
| | | OFF | No activity. |
| HDD1/HDD2/ HDD3 LED | | Green | The installed Serial ATA HDD is in good condition. |
| | | OFF | HDD failure or no HDD is installed. |
| HDD Access LED | | Green | Data is being read/written into the HDD. |
| | | OFF | No activity. |

## 1.7.2 LAN (RJ-45) LEDs



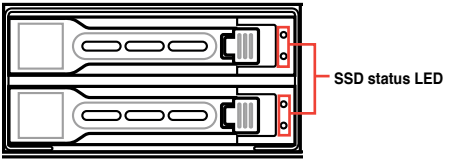

| ACT/LINK LED | | SPEED LED | |
|---|---|---|---|
| **Status** | **Description** | **Status** | **Description** |
| OFF | No link | OFF | 10 Mbps connection |
| GREEN | Linked | ORANGE | 100 Mbps connection |
| BLINKING | Data activity | GREEN | 1 Gbps connection |

## 1.7.3 SFP+ status LEDs



| Activity/Link LED | | Speed LED | |
|---|---|---|---|
| **Status** | **Description** | **Status** | **Description** |
| OFF | No activity | OFF | - |
| BLINKING | Data activity | AMBER | 1 Gbps connection |
| | | GREEN | 10 Gbps connection |

## 1.7.4 SSD status LEDs




| SSD LED | Description |
|---|---|
| GREEN | The installed SSD is in good condition |
| OFF | SSD failure or no SSD is installed |

# Chapter 2

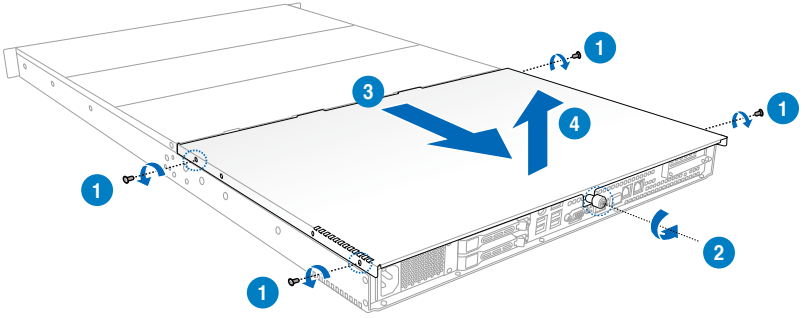
This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

# Hardware setup

# 2.1 Chassis cover

## Removing the rear cover

1. Release the four (4) screws on the sides of the chassis.
2. Release the thumbscrew on the rear of the chassis.
3. Slide the chassis cover towards the rear to disengage it from the chassis.
4. Lift the chassis cover to completely remove it from the chassis.




A protection film is pre-attached to the system cover before shipping. Please remove the protection film before turning on the system for proper heat dissipation.

## 2.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA 1150 Socket designed for the Intel® Sandy Bridge and Ivy Bridge series processors.

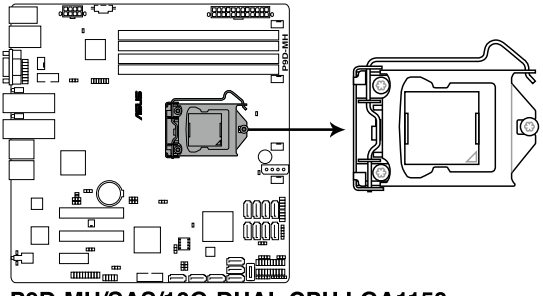
Ensure that all power cables are unplugged before installing the CPU.

- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS shoulders the repair cost only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA 1150 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

### 2.2.1 Installing the CPU

To install a CPU

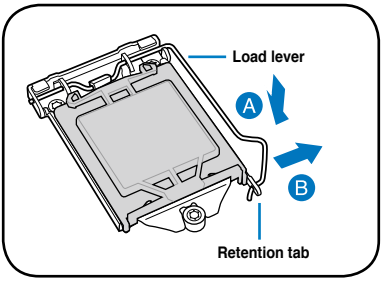
1. Locate the CPU socket on the motherboard.




**P9D-MH/SAS/10G-DUAL CPU LGA1150**

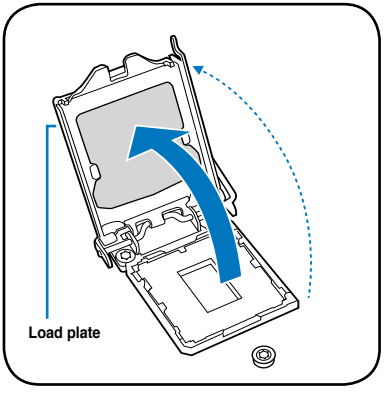
Before installing the CPU, ensure that the socket box is facing toward you and the load lever is on your right.

2. Press the load lever with your thumb (A), then move it to the right (B) until it is released from the retention tab.

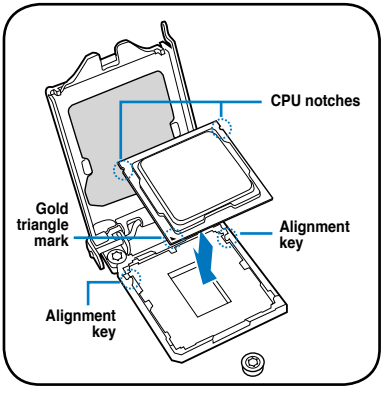



Do not remove the PnP cap yet from the CPU socket. Doing so may bend the pins of the socket.

3. Lift the load lever until the load plate is completely lifted.

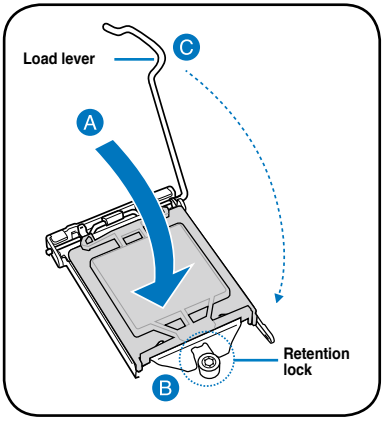



4. Position the CPU above the socket, ensuring that the gold triangle mark is on the bottom-left corner of the socket, then fit the CPU notches to the socket's alignment keys.

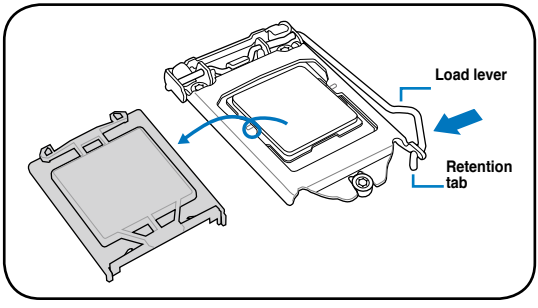



The CPU fits in only one orientation. DO NOT force the CPU into the socket to prevent bending the pins on the socket and damaging the CPU.

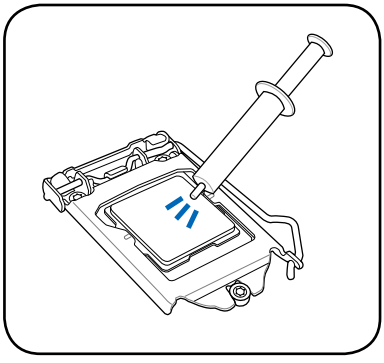
5. Close the load plate (A), ensuring that the front edge of the load plate slides under the retention lock (B) then push down the load lever (C).




6. Insert the load lever under the retention tab to remove the PnP cap from the CPU socket.




7. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is evenly spread in a thin layer.



Some heatsinks come with pre-applied Thermal Interface Material. If so, skip this step.

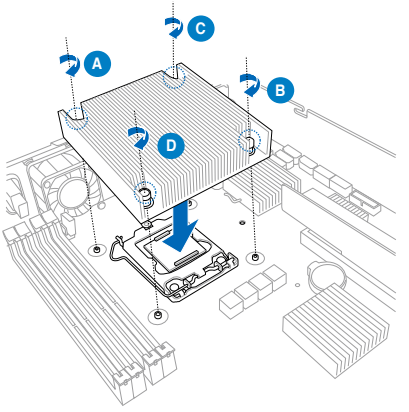
The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately and seek professional medical help.

## 2.2.2 Installing the CPU heatsink

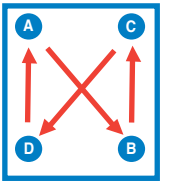
To install the CPU heatsink

1. Place the heatsink on top of the installed CPU, ensuring that the four fasteners match the holes on the motherboard.

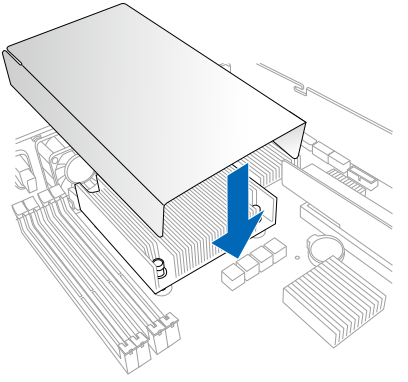
2. Twist each of the four screws with a Phillips screwdriver just enough to attach the heatsink to the motherboard. When the four screws are attached, tighten them one by one to completely secure the heatsink.



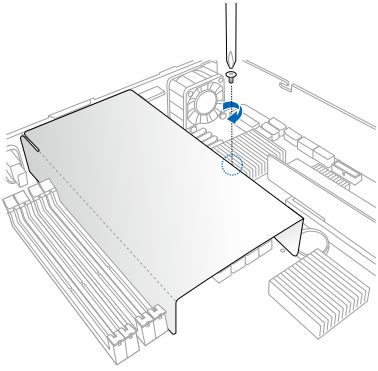

Tighten the four heatsink screws in a criss-cross sequence.




3. Place the airduct cover on top of the heatsink and CPU assembly. Ensure that the airduct cover is fitted securely in place.



4. Secure the airduct cover to the motherboard with a screw.

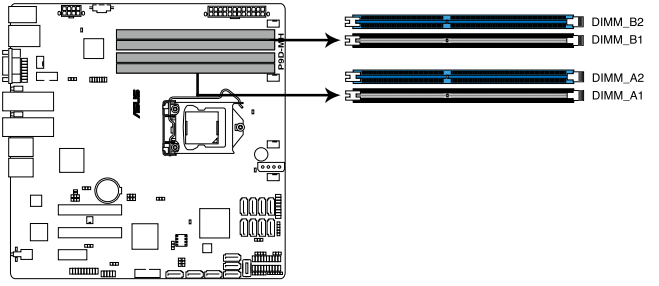


## 2.3 System memory

### 2.3.1 Overview

The motherboard comes with four (4) Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR3 DIMM sockets:




**P9D-MH series 240-pin DDR3 DIMM sockets**

### 2.3.2 Memory Configurations

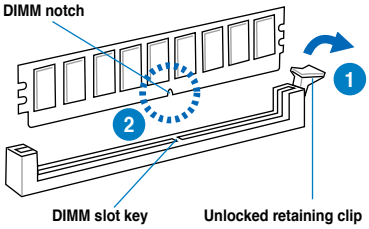
You may install 2GB, 4GB and 8GB Unbuffered with ECC DDR3 DIMMs into the DIMM sockets using the memory configurations in this section.

| UDIMM | | | | |
|---|---|---|---|---|
| DIMM Slot Per Channel | DIMM Populated per Channel | DIMM Type | Speed | Rank per DIMM |
| 2 | 1 | Unbuffered DDR3 ECC | 1333/1600 | Single Rank, Dual Rank |
| 2 | 2 | Unbuffered DDR3 ECC | 1333/1600 | Single Rank, Dual Rank |

- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
- Start installing the DIMMs in slots A2 and B2 (Blue).

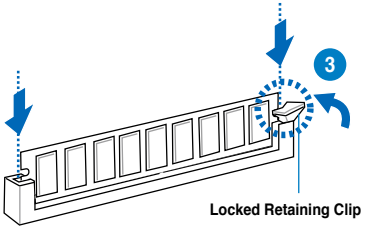
## 2.3.3 Installing a DIMM

1. Unlock a DIMM socket by pressing the retaining clip outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.




A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

3. Hold the DIMM by both of its ends then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.

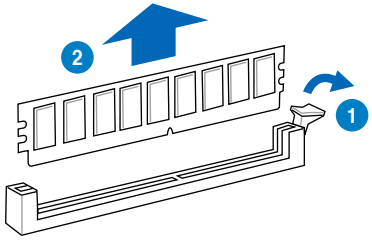



Always insert the DIMM into the socket vertically to prevent DIMM notch damage.

- To install two or more DIMMs, refer to the user guide bundled in the motherboard package.
- Refer to the user guide for qualified vendor lists of the memory modules.

### Removing a DIMM from a single clip DIMM socket

1. Press the retaining clip outward to unlock the DIMM.
2. Remove the DIMM from the socket.

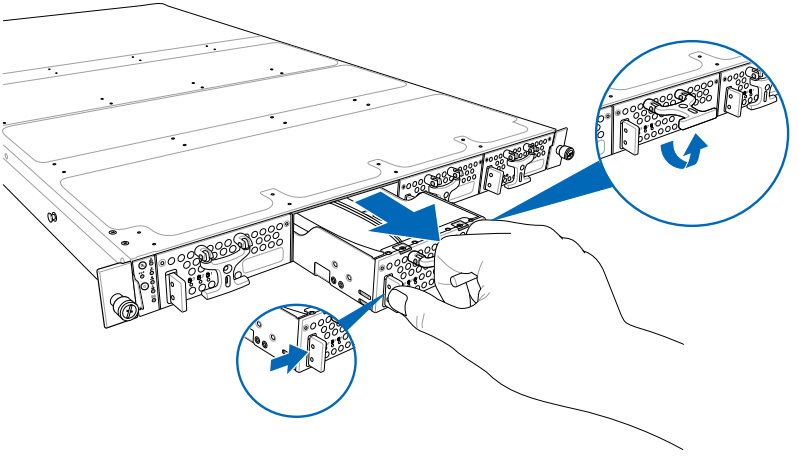



Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

## 2.4 Hard disk drives (HDDs)

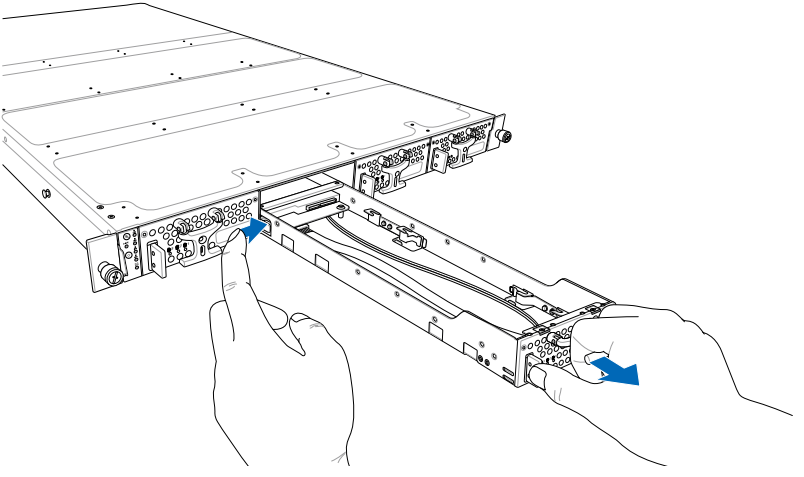
The system allows you to install up to twelve (12) Serial ATA HDDs via four (4) drive trays that each support three (3) Serial ATA HDDs. Refer to the succeeding steps to install Serial ATA HDDs:

1. Lift the drive tray handle and squeeze the drive tray lock, then pull the drive tray.



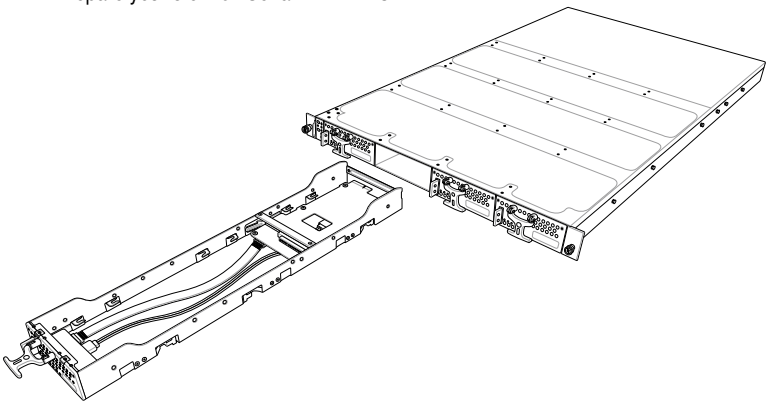
2. Press the metal stopper to release the drive tray then pull the drive tray completely out of the drive bay.

Use both hands when performing this step.



3. Place the drive tray on a flat and stable surface.

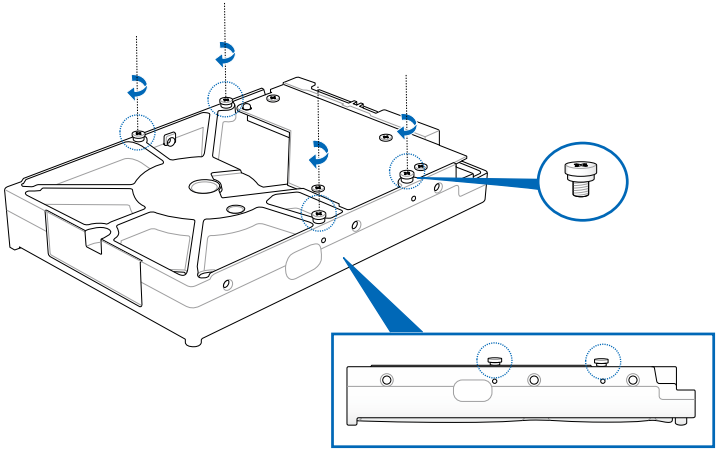
4. Prepare your 3.5-inch Serial ATA HDDs.



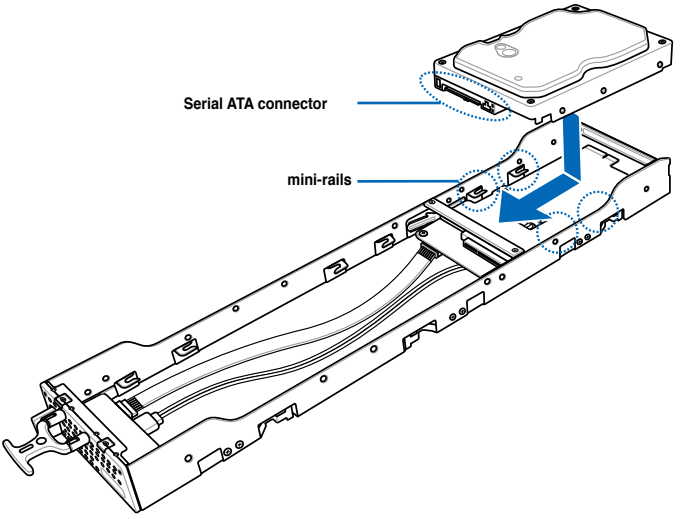
5. Get four (4) screws from the bundled set of special screws.

6. Attach the screws at the bottom of the Serial ATA HDD that you want to install. Use a Phillips screwdriver to secure the screws and mind the gap between the bottom of the HDD and the head of screws.

Mind the gap between the bottom of HDD and the head of screws.



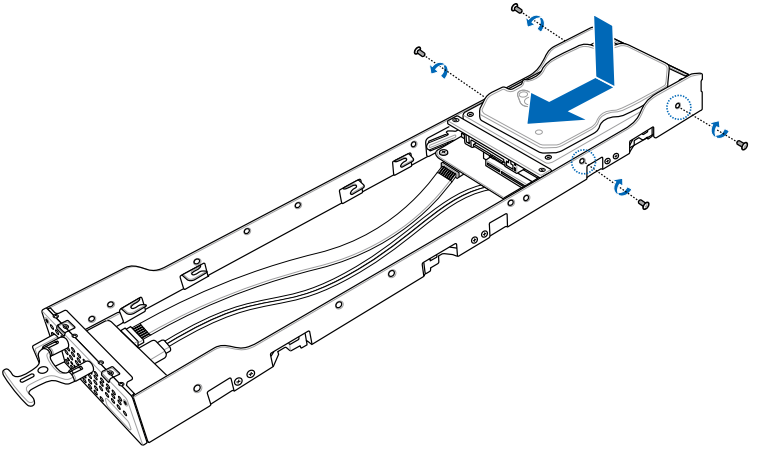
7. Orient the HDD on top of the HDD drive tray slot in such a way that the HDD's connector is aligned with the Serial ATA connector of the HDD slot and the four (4) HDD bottom screws are matched with the four (4) mini-rails of the HDD slot.



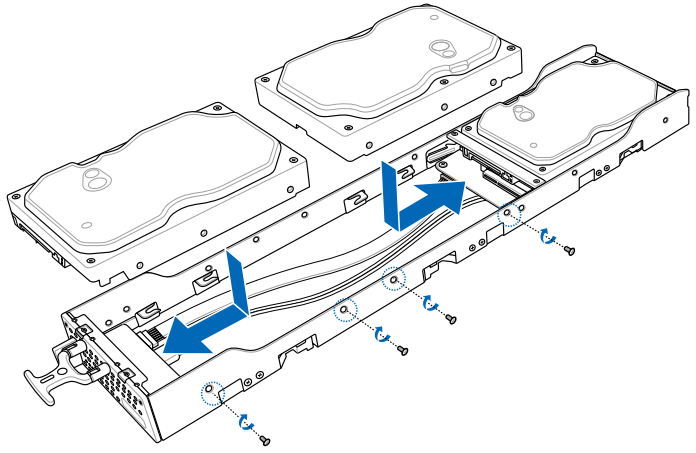

8. Carefully place the Serial ATA HDD on the HDD slot of the drive tray then slide the HDD towards the SATA connector.

Ensure that the four HDD bottom screws are fitted securely on the mini-rails of the drive tray HDD slot and the SATA connector is connected properly.

9. Secure the Serial ATA HDD on the drive tray with four (4) flat head screws.

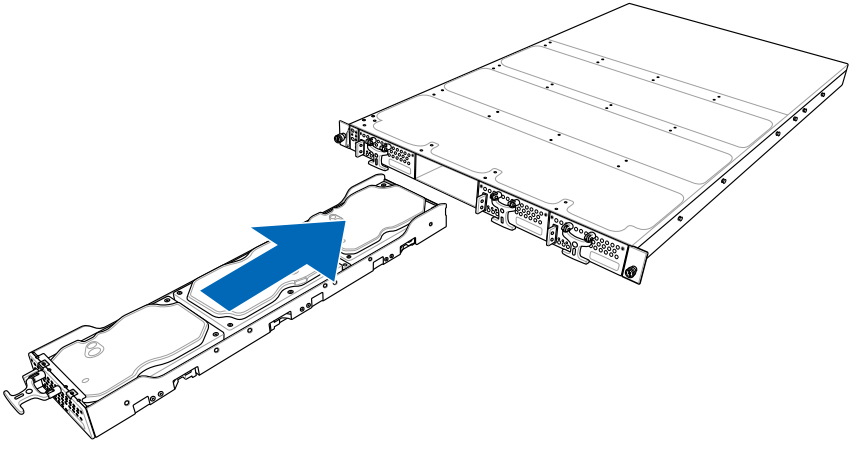


10. Repeat steps 4—8 to install the other two Serial ATA HDDs.



11. After installing all the Serial ATA HDDs, align and insert the HDD drive tray assembly into the drive bay until it is securely fitted in place.

- It is recommended to use both hands when performing this step.
- Two people may be required to perform this step.

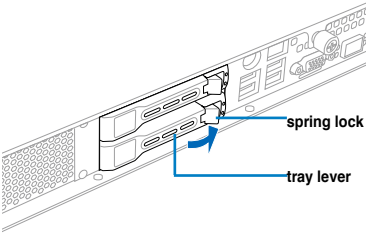


## 2.5 Installing SSDs

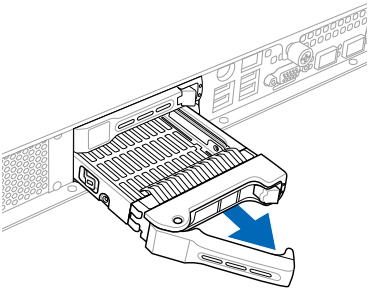
The server have two SSD bays with Hot-Swap support located at the rear panel. The SSD bays allows you to install up to two 2.5-inch SSDs for additional data storage.

To install an SSD:

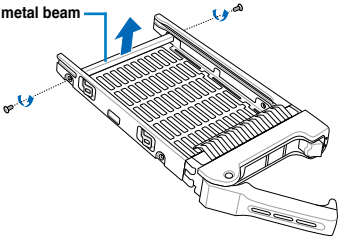
1. Press the spring lock to release to release the tray lever.




2. Firmly hold the tray lever then pull the drive tray out of the bay.

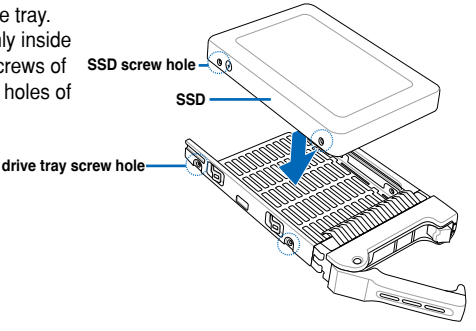


3. Release the screws on each side of the drive tray to release the drive tray metal beam.

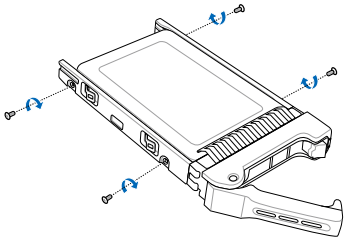



The drive tray metal beam provides horizontal support to the empty drive tray and prevents the drive tray from being bent or deformed.

4. Orient and place the SSD into the tray. Ensure that the SSD is fitted firmly inside the drive tray and that the four screws of the SSD matches the four screw holes of the drive tray.

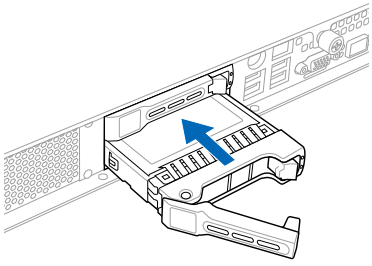


5. Secure the SDD to the drive tray with four screws that is bundled.



6. Align and insert the drive tray and SSD assembly into the drive bay until it is securely fitted in place.

When installed, the SATA connector on the drive connects to the SATA interface on the backplane.



7. Repeat steps 1—6 if you want to install the second SSD drive.

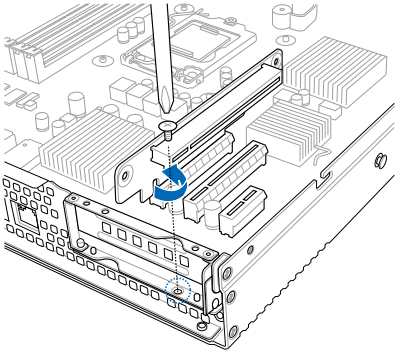
## 2.6 Expansion slot

### 2.6.1 Installing an expansion card to the riser card bracket

The barebone server comes with a riser card bracket. You need to remove the bracket if you want to install PCI Express x8 expansion cards.

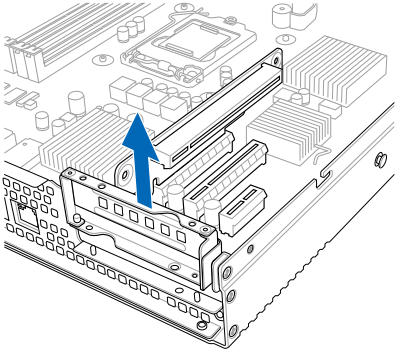
To install a PCI Express x8 card:

1. Remove the chassis cover. Refer to section **2.1 Chassis cover** for details.
2. Release the screw that secures the expansion slot bracket.

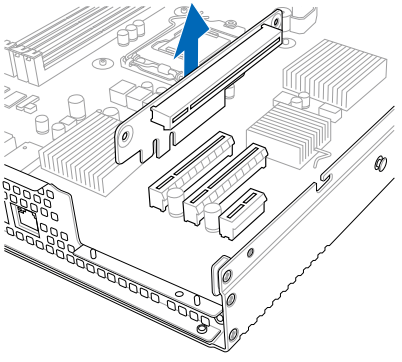


Set aside the screw for later use.

3. Remove the expansion slot metal bracket.

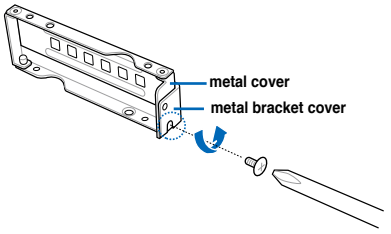


4. Remove the PCIe riser card.



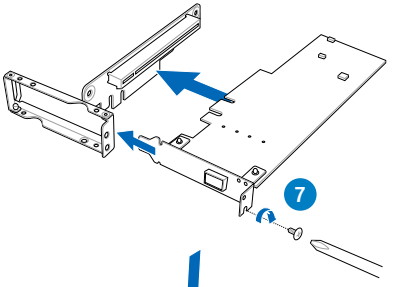
5. Release the screw that secures the metal bracket cover.

Set aside the screw for later use.

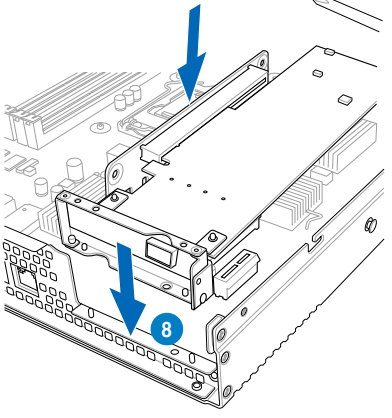



6. Align and insert the PCIe card into the riser card.

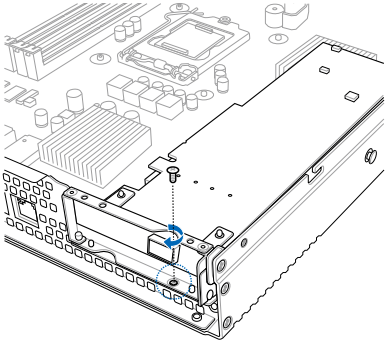
7. Secure the PCIe card into the riser card with the screw that you removed in step 5. Ensure that the PCIe card fits firmly into the riser card slot.




8. Align and insert the PCIe riser card and PCIe card assembly into the PCIe slot on the motherboard. Ensure that it is seated firmly in place.




9. Secure the PCIe riser card and PCIe card assembly with the screw that you removed in step 2.



## 2.6.2 Configuring an expansion card

After installing the expansion card, configure the it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 5 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the following tables.
3. Install the software drivers for the expansion card.

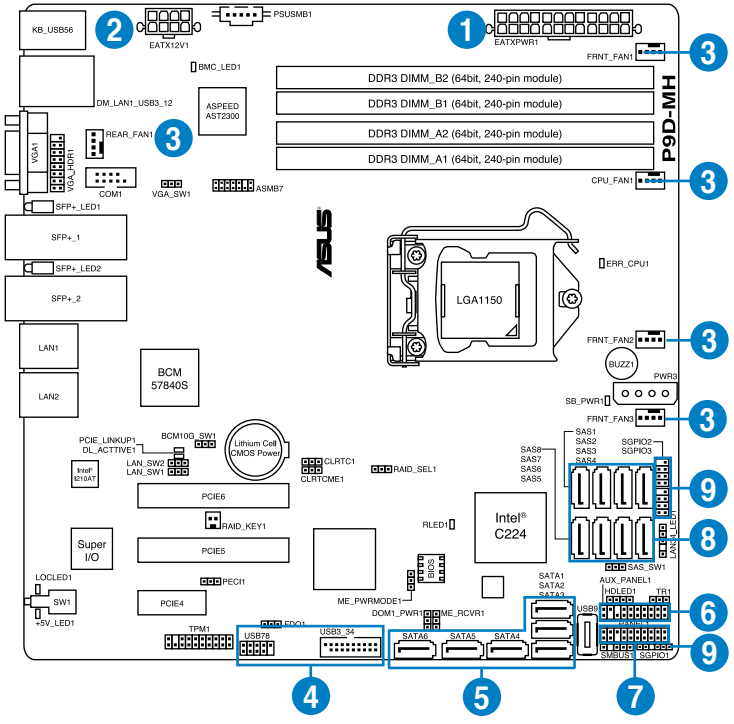
### Standard Interrupt assignments

| IRQ | Priority | Standard function |
|---|---|---|
| 0 | 1 | System Timer |
| 1 | 2 | Keyboard Controller |
| 2 | - | Programmable Interrupt |
| 3* | 11 | Communications Port (COM2) |
| 4* | 12 | Communications Port (COM1) |
| 5* | 13 | -- |
| 6 | 14 | Floppy Disk Controller |
| 7* | 15 | -- |
| 8 | 3 | System CMOS/Real Time Clock |
| 9* | 4 | ACPI Mode when used |
| 10* | 5 | IRQ Holder for PCI Steering |
| 11* | 6 | IRQ Holder for PCI Steering |
| 12* | 7 | PS/2 Compatible Mouse Port |
| 13 | 8 | Numeric Data Processor |
| 14* | 9 | Primary IDE Channel |
| 15* | 10 | Secondary IDE Channel |

*** These IRQs are usually available for ISA or PCI devices.**

## 2.7 Cable connections

- The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.
- Refer to Chapter 4 for detailed information on the connectors.




### Standard cables connected to the motherboard

1. 24-pin ATX power connector (from power supply to motherboard)
2. 8-pin 12V power connector (from power supply to motherboard)
3. System fan connector (from system fan to motherboard)
4. USB connector (from motherboard to front I/O board)
5. SATA conectors (system default; from motherboard to SATA/SAS backplane)
6. System auxiliary panel connector (from motherboard to front I/O board)
7. System panel connector (from motherboard to front I/O board)
8. SAS connectors (from motherboard to SATA/SAS backplane)
9. Serial General Purpose Input/Output connectors

## 2.8 Removable/optional components

You may need to remove previously installed system components when installing or removing system devices. Or you may need to install the optional components into the system. This section tells how to remove/install the following components:

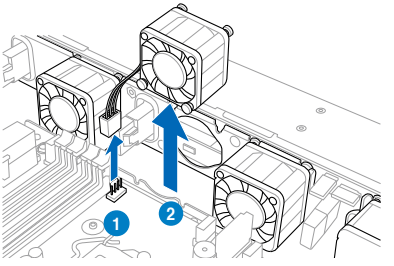
1. System fans
2. ASUS ASMB7-iKVM (optional)

Ensure that the system is turned off before removing any components.

### 2.8.1 System fans

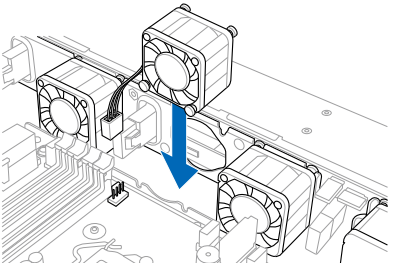
To uninstall the system fans:

1. Disconnect the system fan cable from the fan connector on the motherboard.
2. Lift the fan and set aside.
3. Repeat steps 1—2 to remove the other fans.



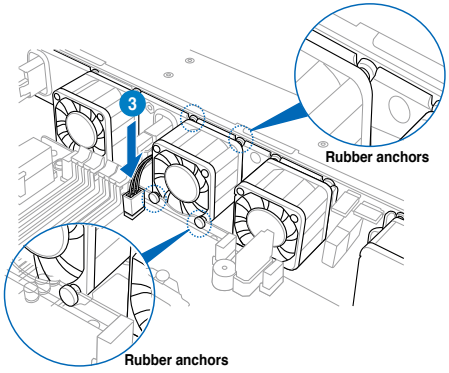

To reinstall the system fans:

1. Align and insert the fan into the fan slot.



2. Ensure that the rubber anchors are fitted neatly on the fan slot notches.

3. Connect the system fan cable into the fan connector.

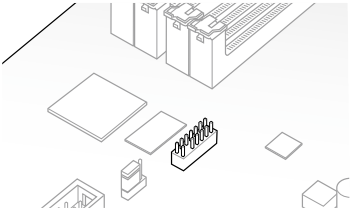



4. Repeat steps 1—2 to install the other fans.

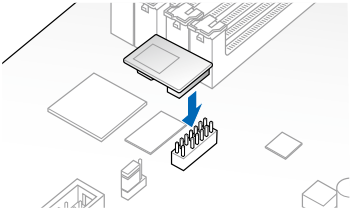
## 2.8.2 Installing ASMB7 series management board (optional)

Follow the steps below to install an optional ASMB7 series management board on your motherboard.

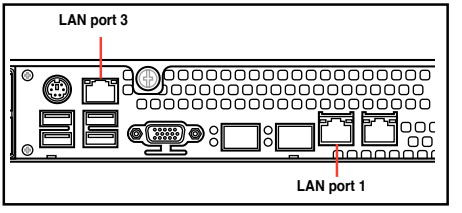
1. Locate the Baseboard Management Card header on the motherboard.



2. Orient and press the Management Card in place.



3. Insert the LAN cable plug to the LAN port 3 (dedicated LAN) or LAN port 1 (shared LAN) for server management.



# Chapter 3

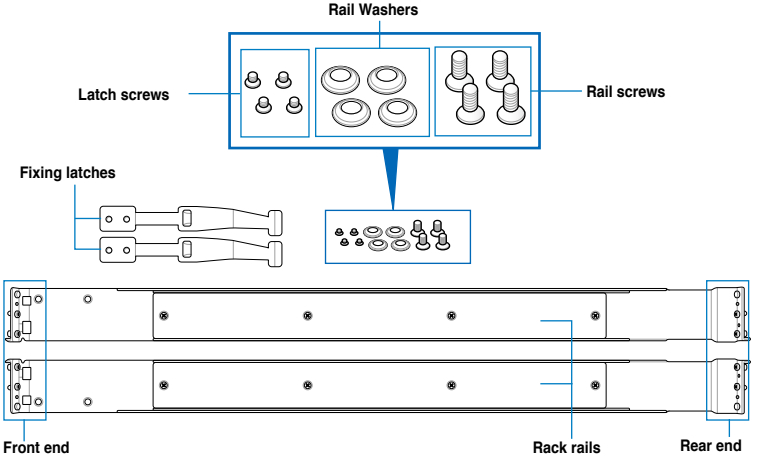
This chapter describes how to install the optional components and devices into the barebone server.

# Installation options

## 3.1 Friction Rail Kit Installation Guide

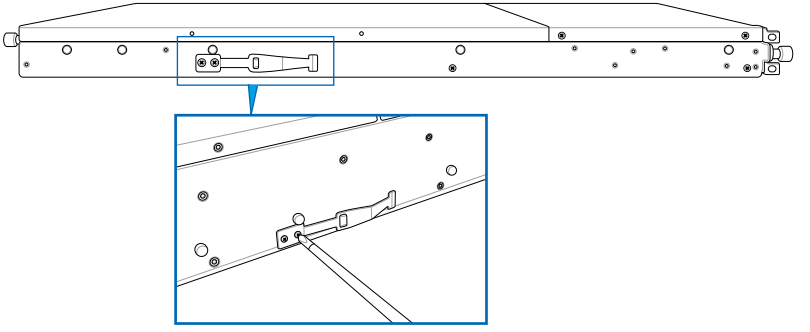
Your friction rail kit package contains:

- One pair of rack rails
- One pair of fixing latches
- 4 latch screws, 4 rail screws and 4 rail washers (2 more for each buffer)




### 3.1.1 Attaching the fixing latches to the server

1. Secure the two fixing latches to the two sides of the server with the four latch screws.

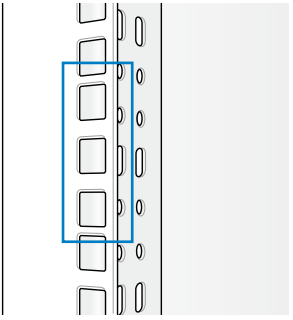


The locations of the screw holes vary with different server models. Refer to your server user manual for details.

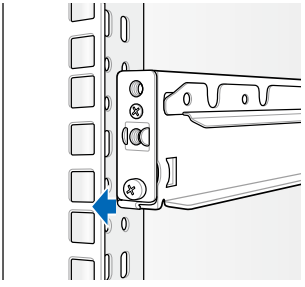
2. Select a 1U space on the rack where you want to install the rack rail.

   A 1U space is consists of three square mounting holes with two thin lips on the top and the bottom.

3. Adjust the rack rail to fit the depth of the rack.

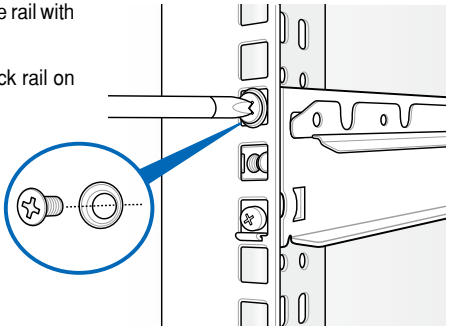


4. From inside the rack, place the rear rail hook on the bottom thin lip of the rear mounting hole, then place the front rail hook on the bottom thin lip of the front mounting hole.

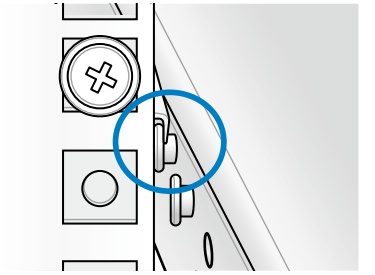


5. Secure the front and rear ends of the rail with two rack screws and washers.

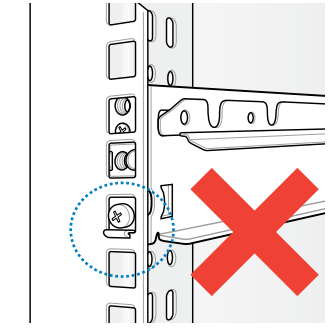
6. Repeat step 3 to 5 to attach the rack rail on the other side of the rack.



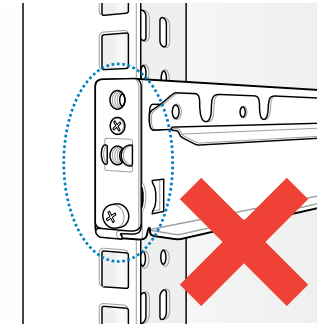
7. When mounting the server to the rack, ensure to include the side knots on the two sides of the server in the rack rail holders.



Do not install the rail kit in the following situation:



**DO NOT place the rail hook on a thick lip of the mounting hole.**



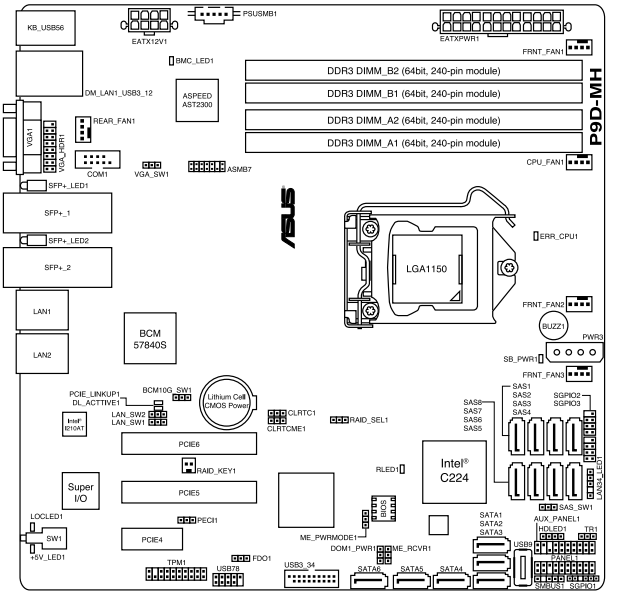
**DO NOT install the rail to the outer side of the server rack.**

# Chapter 4

This chapter includes the motherboard layout and brief descriptions of the jumpers and internal connectors.

Motherboard Info

# 4.1 Motherboard layout

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# 4.2 Jumpers

**1. Clear RTC RAM (3-pin CLRTC1)**

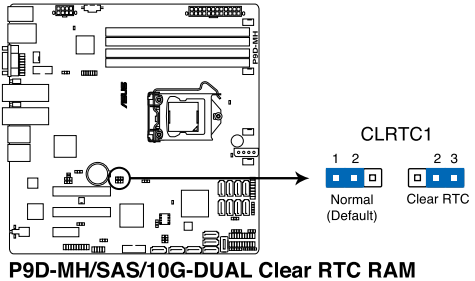
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

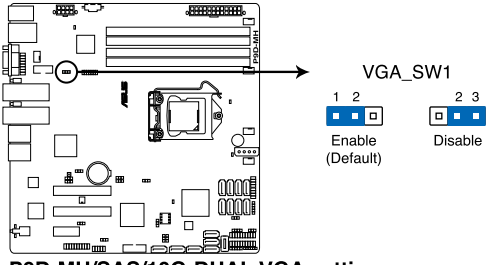
If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.




**P9D-MH/SAS/10G-DUAL Clear RTC RAM**

**2. VGA controller setting (3-pin VGA_SW1)**

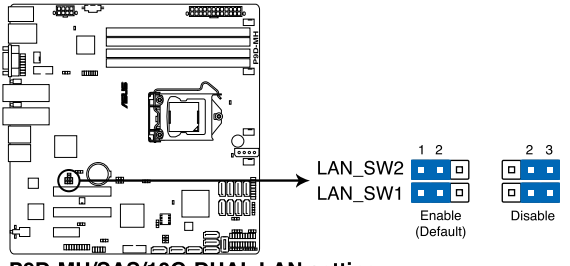
This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1–2 to activate the VGA feature.




**P9D-MH/SAS/10G-DUAL VGA setting**

**3. LAN controller setting (3-pin LAN_SW1, LAN_SW2)**

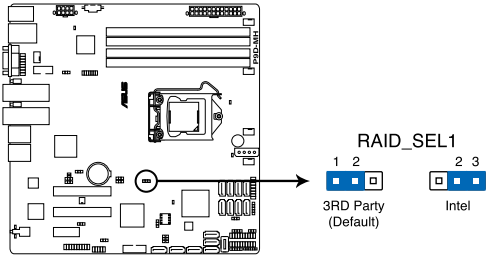
These jumpers allow you to enable or disable the onboard Intel® I210AT Gigabit LAN controllers. Set to pins 1-2 to activate the Gigabit LAN feature.




**P9D-MH/SAS/10G-DUAL LAN setting**

**4. RAID configuration utility selection (3-pin RAID_SEL1)**

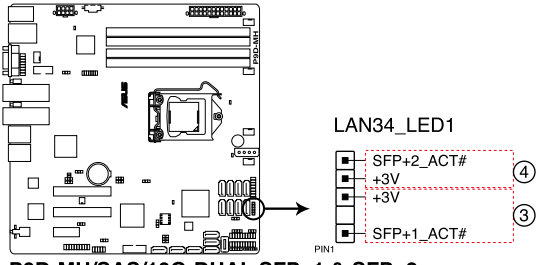
This jumper allows you to select the RAID configuration utility to use when you create disk arrays. Place the jumper caps to pins 2–3 to use the Intel® Rapid Storage Technology.




**P9D-MH/SAS/10G-DUAL RAID setting**

**5. SFP+12 LED connectors (5-1 pin LAN34_LED1)**

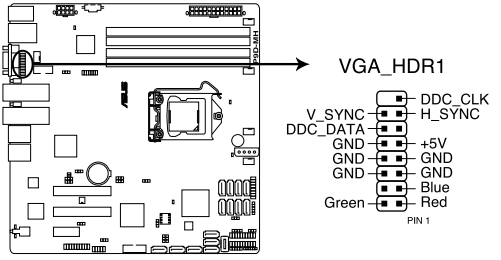
These leads are for 10Gb LAN activity LEDs on the front panel. Connect the LAN LED cable to the backplane for LAN activity indication.




**P9D-MH/SAS/10G-DUAL SFP+1 & SFP+2**

**6. VGA connector (16-1 pin VGA_HDR1)**

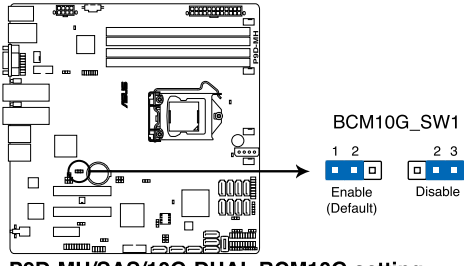
This connector supports the VGA High Dynamic-Range interface HDR1.




**P9D-MH/SAS/10G-DUAL VGA connector**

**7. Broadcom 10GbE controller setting (3 pin BCM10G_SW1)**

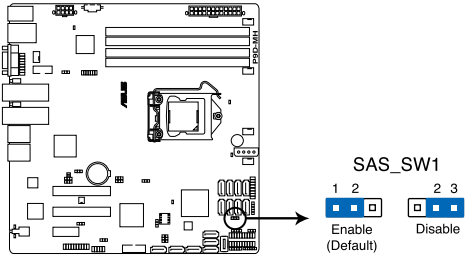
This jumper allows you enable or disable the Broadcom 10Gb chip. The Broadcom 10Gb chip is a converged controller that enables convergence of all the possible network communications in a server such as data network. Set to pins 1-2 to enable, otherwise set to pins 2-3 to disable the Broadcom 10Gb chip.




**P9D-MH/SAS/10G-DUAL BCM10G setting**

**8. LSI 2308 SAS/SATA RAID controller setting (3 pin SAS_SW1)**

This jumper allows you enable or disable the LSI 2308 SAS/SATA RAID controller. Set to pin 1-2 to enable, otherwise set to pin 2-3 to disable the LSI 2308 SAS/SATA RAID controller.




**P9D-MH/SAS/10G-DUAL SAS setting**

## 4.3 Internal connectors

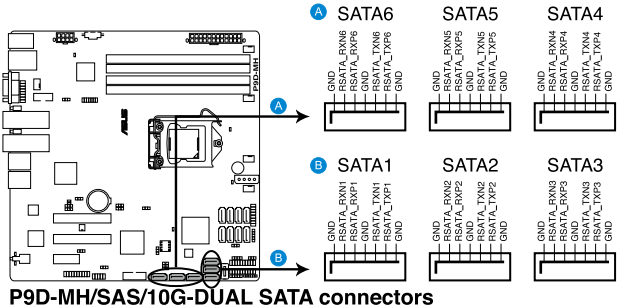
### 1. Serial ATA 6.0/3.0 Gbps connectors

**(7-pin SATA 6Gbps_1-4 connector [Light Blue])**

**(7-pin SATA 3Gbps_5-6 connector [Black])**

Supported by the Intel® C224 chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 6Gbps of data transfer rate.
If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10, or RAID 5 configuration.

The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

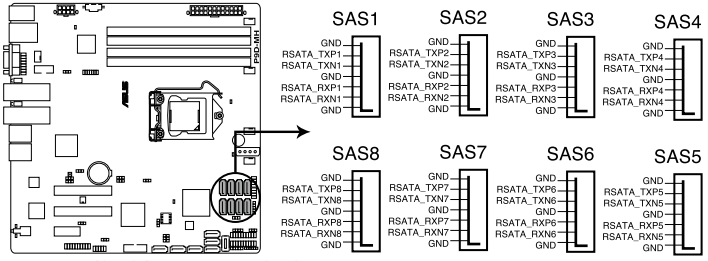



**P9D-MH/SAS/10G-DUAL SATA connectors**

**2. SAS connectors (7-pin SAS connector [Light Blue])**

Supported by the LSI 2308 SAS/SATA RAID controller, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 6Gbps of data transfer rate.

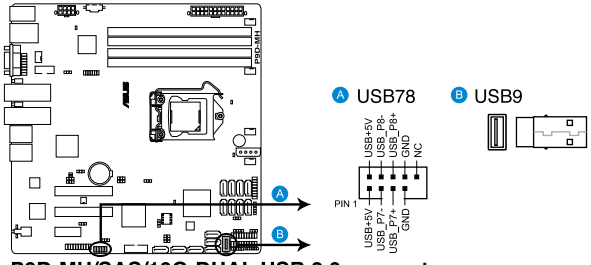
If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10, or RAID 1E configuration.




**P9D-MH/SAS/10G-DUAL SAS connectors**

**3. USB 2.0 connector (10-1 pin USB78; A-Type USB9)**

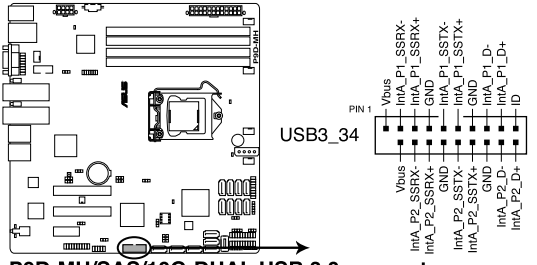
These connectors are for USB 2.0 ports. Connect the USB module cables to connectors USB78. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.




**P9D-MH/SAS/10G-DUAL USB 2.0 connectors**

**4. USB 3.0 connector (20-1 pin USB3_34)**

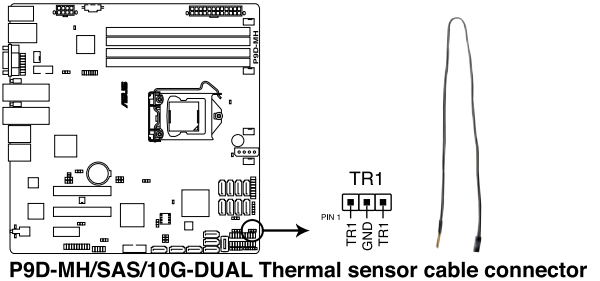
These connectors allow you to connect a USB 3.0 module for additional USB 3.0 front or rear panel ports. With an installed USB 3.0 module, you can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.




**P9D-MH/SAS/10G-DUAL USB 3.0 connector**

**5. Thermal sensor cable connectors (3-pin TR1)**

This connector allows you to connect a Thermal sensor cable that is used for temperature monitoring. Connect the Thermal sensor cable to the connector and place its probe to the device that you want to check the temperature.



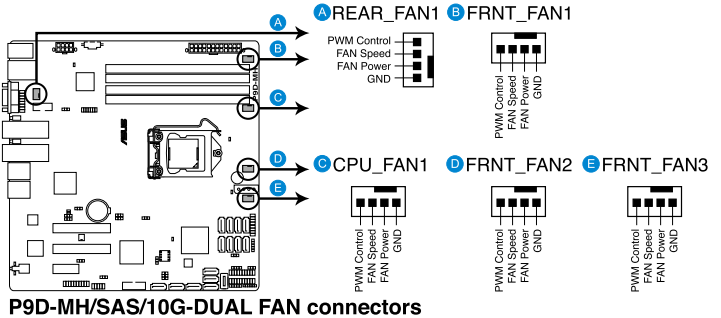

**P9D-MH/SAS/10G-DUAL Thermal sensor cable connector**

**6. CPU, front, and rear fan connectors**

**(4-pin CPU_FAN1, FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, REAR_FAN1)**

The fan connectors support cooling fans. Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.

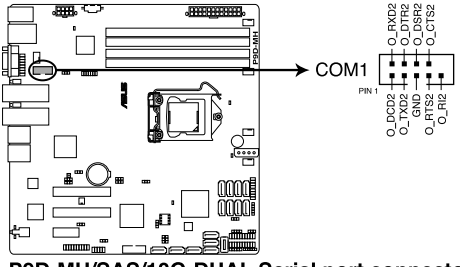
- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.
- These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fans feature the ASUS Smart Fan technology.




**P9D-MH/SAS/10G-DUAL FAN connectors**

**7. Serial port connectors (10-1 pin COM1)**

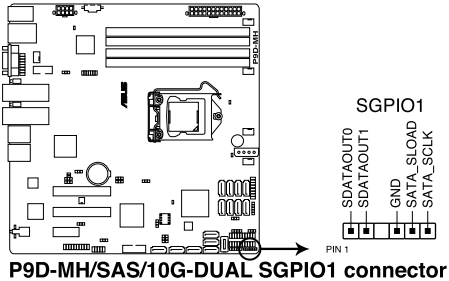
These connectors are for the serial COM ports. Connect the serial port module cable to one of these connectors, then install the module to a slot opening at the back of the system chassis.




**P9D-MH/SAS/10G-DUAL Serial port connector**

**8. Serial General Purpose Input/Output connector (6-1 pin SGPIO1)**

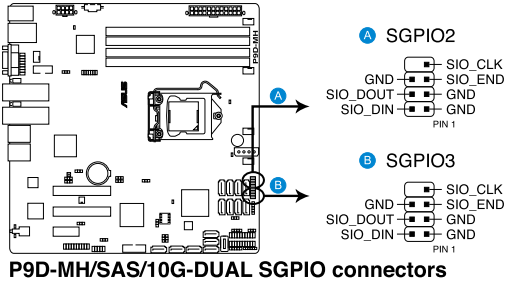
The SGPIO 1 connector is used for the Intel Rapid Storage Technology Enterprise SGPIO interface that controls the LED pattern generation, device information, and general purpose data.




**P9D-MH/SAS/10G-DUAL SGPIO1 connector**

**Serial General Purpose Input/Output connectors (8-1 pin SGPIO2, SGPIO3)**

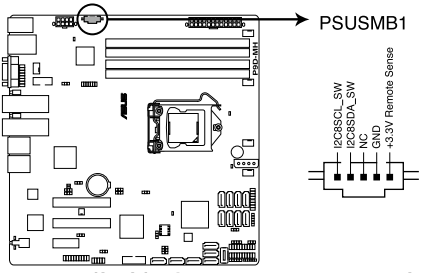
The SGPIO 2 and SGPIO 3 connectors are for the LSI 2308 RAID controller.




**P9D-MH/SAS/10G-DUAL SGPIO connectors**

**9. Power Supply SMBus connector (5-pin PSUSMB1)**

This connector allows you to connect SMBus (System Management Bus) to the power supply unit to read PSU information. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.

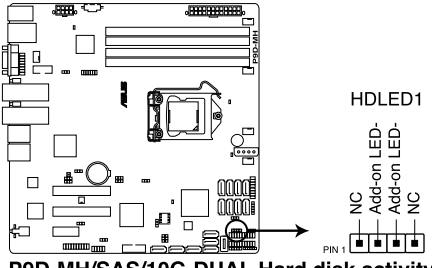



**P9D-MH/SAS/10G-DUAL Power supply SMBus connector**

This connector functions only when you install the ASUS ASMB7.

**10. Hard disk activity connector (4-pin HDLED1)**

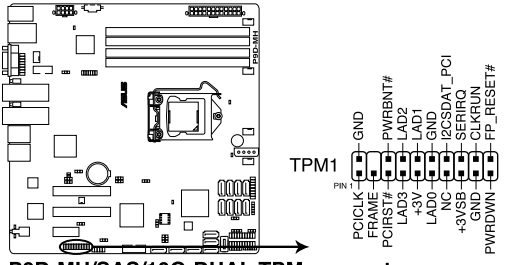
This LED connector is for the storage add-on card cable connected to the SATA or SAS add-on card. The read or write activities of any device connected to the SATA or SAS add-on card causes the front panel LED to light up.




**P9D-MH/SAS/10G-DUAL Hard disk activity connector**

**11. Trusted Platform Module connector (20-1 pin TPM1)**

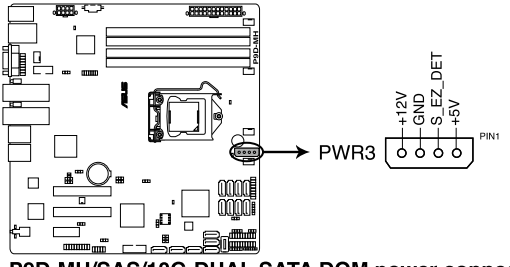
This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.




**P9D-MH/SAS/10G-DUAL TPM connector**

**12. SATA DOM power connector (4-pin PWR3)**

This 4-pin connector is for 5V power of a certain SATA DOM (Disk on Module) device when using an appropriate cable.



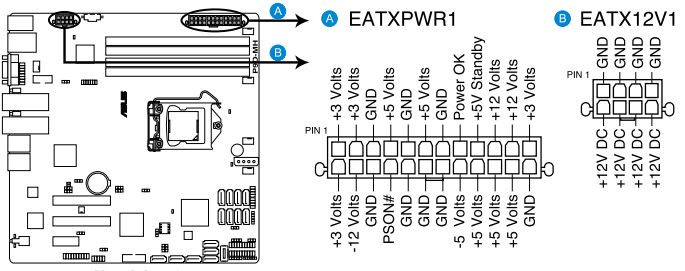

**P9D-MH/SAS/10G-DUAL SATA DOM power connector**

- The SATA DOM power connector is for output power only. It has a maximum output current of 1A.
- Ensure that the power of the SATA DOM device that you will use is less than 1A.

**13. ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)**

These connectors are for the ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

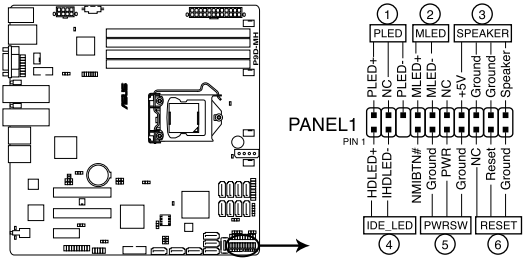
- DO NOT forget to connect the 24-pin, the 8-pin power plugs, and the 4-pin PWR3; otherwise, the system will not boot up.
- Use of a power supply unit (PSU) with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- This motherboard supports ATX2.0 PSU or later version.
- Ensure that your PSU can provide at least the minimum power required by your system.




**P9D-MH/SAS/10G-DUAL 24+8 pin power connectors**

**14. System panel connector (20-1 pin PANEL1)**

This connector supports several chassis-mounted functions.




**P9D-MH/SAS/10G-DUAL System panel connector**

**1. System power LED (3-pin PLED)**

This 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

**2. Message LED (2-pin MLED)**

This 2-pin connector is for the message LED cable that connects to the front message LED. The message LED is controlled by Hardware monitor to indicate an abnormal event occurance.

**3. System warning speaker (4-pin SPEAKER)**

This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

**4. Hard disk drive activity LED (2-pin +HDLED)**

This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

**5. Power button/soft-off button (2-pin PWRSW)**

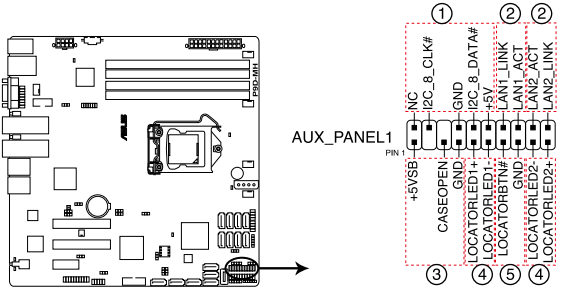
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

**6. Reset button (2-pin RESET)**

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

**15. Auxiliary panel connector (20-2 pin AUX_PANEL1)**

This connector is for additional front panel features including front panel SMB, locator LED and switch, chassis intrusion, and LAN LEDs.




**P9D-MH/SAS/10G-DUAL Auxiliary panel connector**

**1. Front panel SMB (6-1 pin FPSMB)**

These leads connect the front panel SMBus cable.

**2. LAN activity LED (2-pin LAN1LINK and 2-pin LAN2LINK)**

These leads are for Gigabit LAN activity LEDs on the front panel.

**3. Chassis intrusion (4-1 pin AUX_CHASSIS)**

These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to these leads to record a chassis intrusion event. The default setting is short CASEOPEN and GND pin by jumper cap to disable the function.

**4. Locator LED (2-pin AUX_LOCLED1 and 2-pin AUX_LOCLED2)**

These leads are for the Locator LED1 and LED2 on the front panel. Connect the Locator LED cables to these 2-pin connector. The LEDs will light up when the Locator button is pressed.

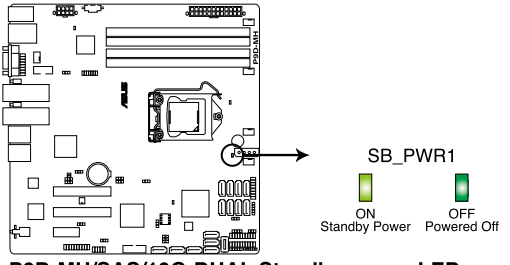
**5. Locator Button/Switch (2-pin AUX_BMCLOCBNT)**

These leads are for the locator button on the front panel. This button queries the state of the system locator.

## 4.4 Onboard LEDs

**1. Standby Power LED (SB_PWR1)**

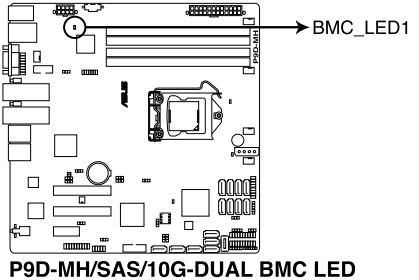
The motherboard comes with a standby power LED. The green LED lights up to indicate that the standby mode of the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard LED.




**P9D-MH/SAS/10G-DUAL Standby power LED**

**2. Baseboard Management Controller LED (BMC_LED1)**

The green heartbeat LED blinks per second to indicate that the ASMB7 is working normally.

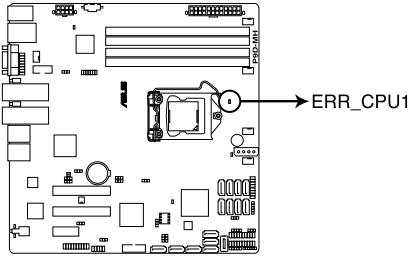



**P9D-MH/SAS/10G-DUAL BMC LED**

The heartbeat LED functions only when you install the ASUS ASMB7 Management card

**3. CPU Warning LED (ERR_CPU1)**

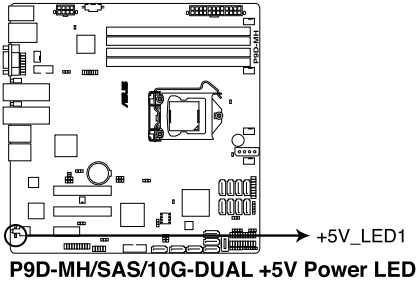
The CPU warning LED lights up to indicate that a CPU error or failure has occurred.




**P9D-MH/SAS/10G-DUAL ERR_CPU LED**

**4. Power LED (+5V_LED1)**

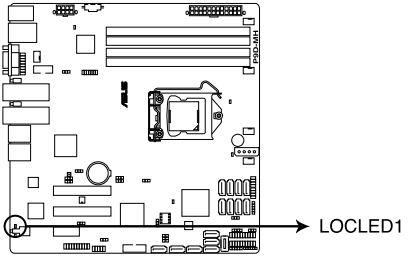
This LED lights up when the Power-on button is pressed and the system is on.




**P9D-MH/SAS/10G-DUAL +5V Power LED**

**5. Location LED (LOCLED1)**

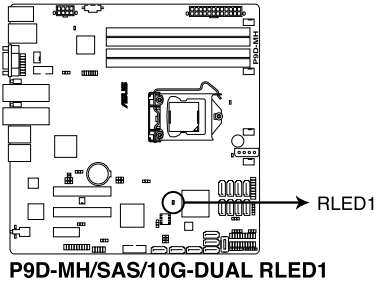
The Location LED is an onboard LED that ligths up when the Location Button on the front panel is pressed. This LED helps you visually locate the server among other servers especially when you are located at the back of the server rack.




**P9D-MH/SAS/10G-DUAL Location LED**

**6. RLED (RLED1)**

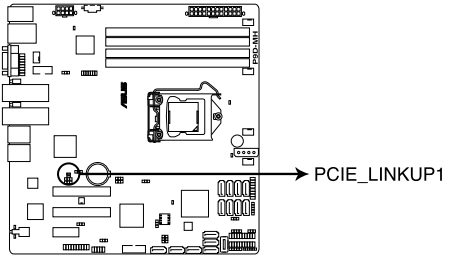
This LED lights up to indicate that the LSI 2308 is working properly. If the LED is unlit, the LSI 2308 is either in fault state or a problem have occurred.




**P9D-MH/SAS/10G-DUAL RLED1**

**7. PCIE LINK Status LED (PCIE_LINKUP1)**

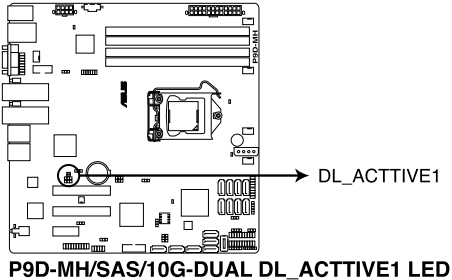
This LED is for the PCIE link status of the Broadcom 10GbE chip. The unlit LED indicates the PCIE link status is not established and green LED indicates activity or operational condition.




**P9D-MH/SAS/10G-DUAL PCIE_LINKUP1 LED**

**8. Data Layer LED (DL_ACTIVE1)**

This LED is for the data layer link status of the Broadcom 10GbE chip. If unlit, the Broadcom 10GbE chip is either in fault state or a problem have occured.




**P9D-MH/SAS/10G-DUAL DL_ACTTIVE1 LED**

# Chapter 5

**This chapter tells how to change the system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.**

# BIOS setup

## 5.1 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup:

1. **ASUS CrashFree BIOS 3**

   To recover the BIOS using a bootable USB flash disk drive when the BIOS file fails or gets corrupted.

2. **ASUS EzFlash**

   Updates the BIOS using a USB flash disk.

3. **BUPDATER**

   Updates the BIOS in DOS mode using a bootable USB flash disk drive.

Refer to the corresponding sections for details on these utilities.

Save a copy of the original motherboard BIOS file to a bootable USB flash disk drive in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the BUPDATER utility.

### 5.1.1 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using a USB flash drive that contains the updated BIOS file.

Prepare a USB flash drive containing the updated motherboard BIOS before using this

#### Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1. Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.
2. The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.

DO NOT shut down or reset the system while recovering the BIOS! Doing so would cause system boot failure!

The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website at www.asus.com to download the latest BIOS file.

## 5.1.2 ASUS EzFlash Utility

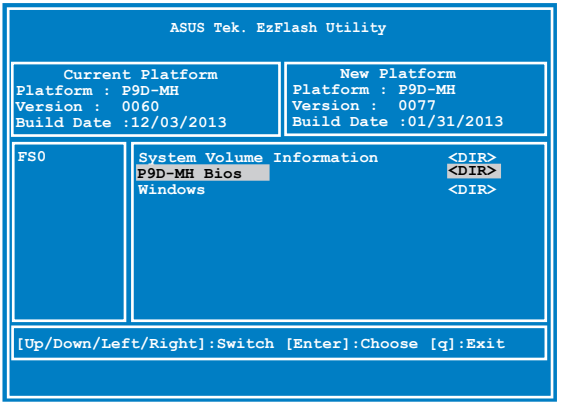
The ASUS EzFlash Utility feature allows you to update the BIOS using a USB flash disk without having to use a DOS-based utility.

Download the latest BIOS from the ASUS website at www.asus.com before using this utility.

The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

To update the BIOS using EzFlash Utility:

1. Insert the USB flash disk that contains the latest BIOS file to the USB port.
2. Enter the BIOS setup program. Go to the **Tool** menu to select **ASUS EzFlash Utility** and press <Enter> to enable it.




3. Press <Tab> to switch to the **Drive** field.
4. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS then press <Enter>.
5. Press <Tab> to switch to the **Folder Info** field.
6. Press the Up/Down arrow keys to find the BIOS file then press <Enter>.
7. Reboot the system when the update process is done.

- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

Ensure to load the BIOS default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.

## 5.1.3 BUPDATER utility

The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

The BUPDATER utility allows you to update the BIOS file in DOS environment using a bootable USB flash disk drive with the updated BIOS file.

### Updating the BIOS file

To update the BIOS file using the BUPDATER utility:

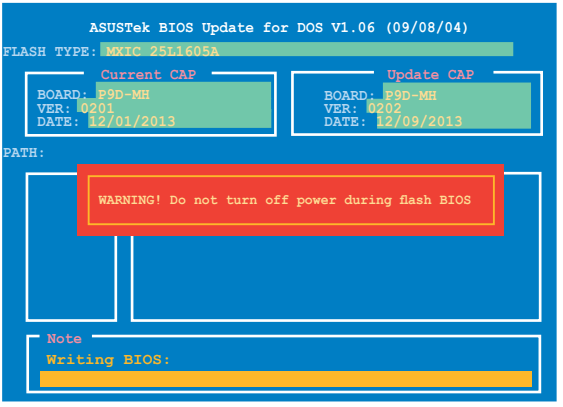
1. Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.
2. Download the BUPDATER utility (BUPDATER.exe) from the ASUS support website at support.asus.com to the bootable USB flash disk drive you created earlier.
3. Boot the system in DOS mode, then at the prompt, type:

   **BUPDATER /i[filename].CAP**

   where [filename] is the latest or the original BIOS file on the bootable USB flash disk drive, then press <Enter>.

```
A:\>BUPDATER /i[file name]CAP
```

The utility verifies the file, then starts updating the BIOS file.




DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

The utility returns to the DOS prompt after the BIOS update process is completed.

4. Reboot the system from the hard disk drive.

## 5.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section **5.1 Managing and updating your BIOS**.

Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to "Run Setup." This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the firmware chip.

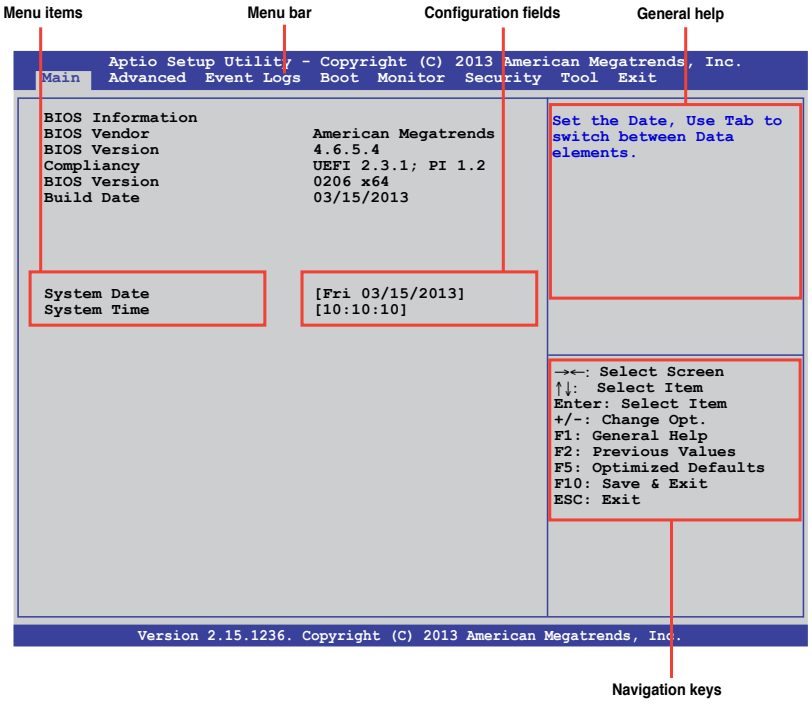
The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl>+<Alt>+<Del>, or by pressing the reset button on the system chassis. You can also restart by turning the system off then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

## 5.2.1 BIOS menu screen




## 5.2.2 Menu bar

The menu bar on top of the screen has the following main items:

| | |
|---|---|
| Main | For changing the basic system configuration |
| Advanced | For changing the advanced system settings |
| Event Logs | For changing the event log settings |
| Boot | For changing the system boot configuration |
| Monitor | For displaying the system temperature, power status, and changing the fan settings |
| Security | For changing the security settings |
| Tool | For configuring options for special functions |
| Exit | For selecting the exit options |

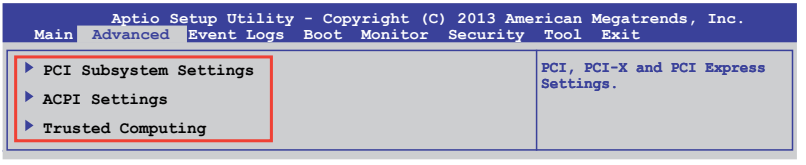
To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

### 5.2.3 Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items. The other items (Advanced, Event Logs, Boot, Monitor, Security, Tool, and Exit) on the menu bar have their respective menu items.

### 5.2.4 Submenu items

A solid triangle before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Event Logs Boot Monitor Security Tool Exit
PCI Subsystem Settings
ACPI Settings
Trusted Computing
PCI, PCI-X and PCI Express Settings.

### 5.2.5 Navigation keys

At the bottom right corner of a menu screen are the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

### 5.2.6 General help

At the top right corner of the menu screen is a brief description of the selected item.

### 5.2.7 Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable. A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

### 5.2.8 Pop-up window

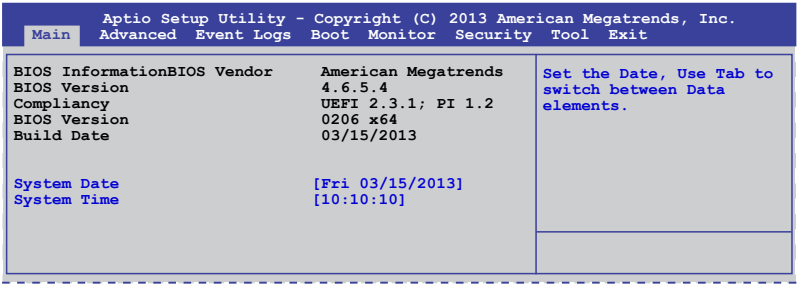
Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

### 5.2.9 Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> /<Page Down> keys to display the other items on the screen.

## 5.3 Main menu

When you enter the BIOS Setup program, the Main menu screen appears. The Main menu provides you an overview of the basic system information, and allows you to set the system date and time.




### 5.3.1 System Date

Allows you to set the system date to **[Day mm/dd/yyyy]**.

Where:

Day = Day of the week

mm = month (numeric value)

dd = day (numeric value)

yyyy = year (numeric value)

### 5.3.2 System Time

Allows you to set the system time to **[hh/mm/ss]**.

Where:

hh = hour (numeric value)

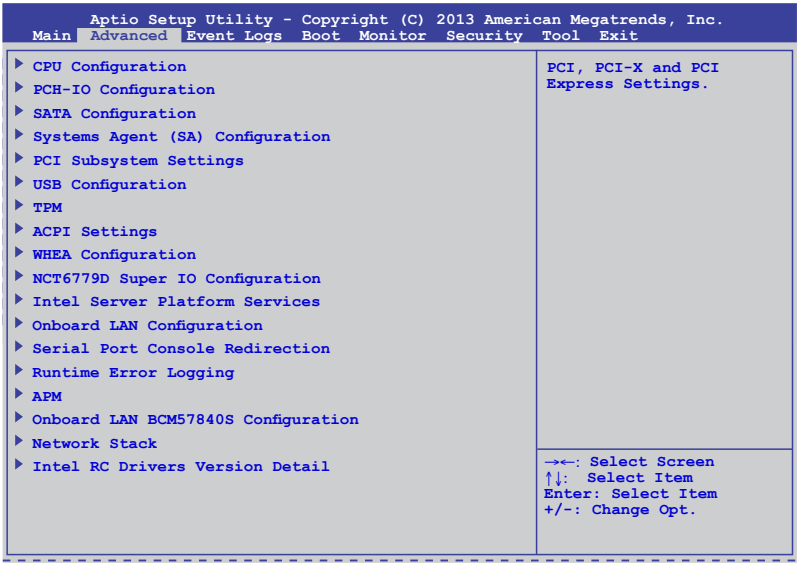
mm = minutes (numeric value)

ss = seconds (numeric value)

## 5.4 Advanced menu

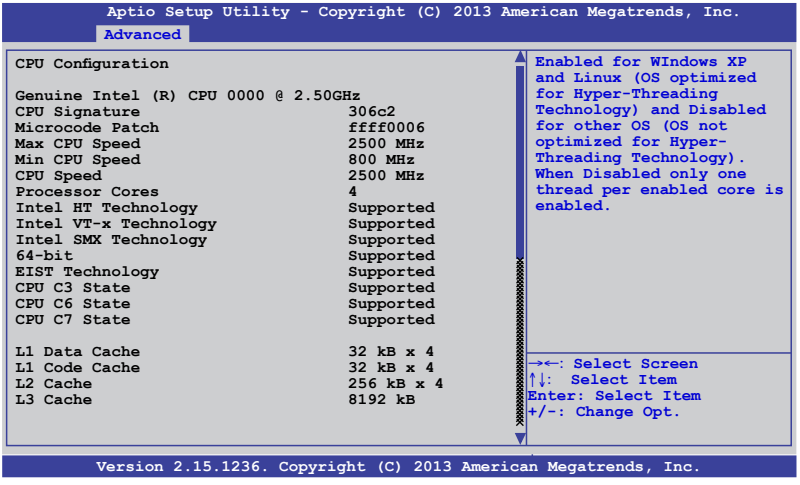
The Advanced menu items allow you to change the settings for the CPU and other system devices.

Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



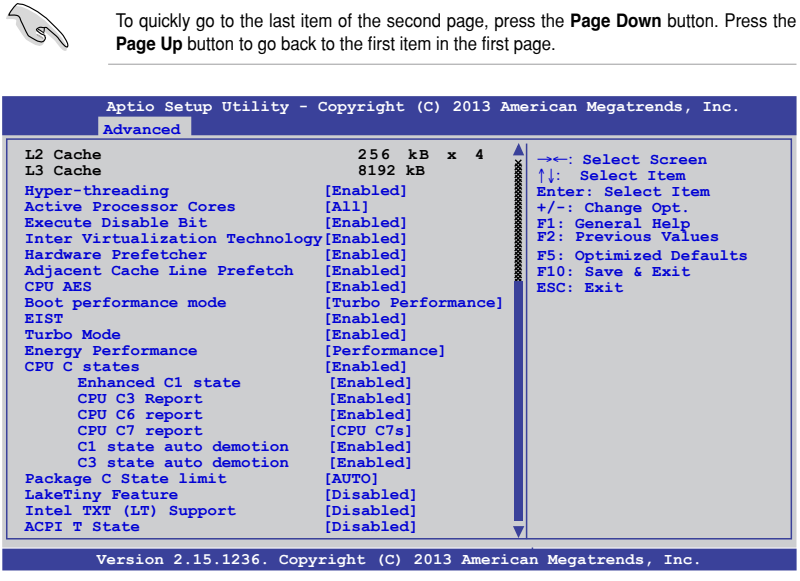
## 5.4.1 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects. Some items may not appear if your CPU does not support the related functions.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
CPU Configuration
Genuine Intel (R) CPU 0000 @ 2.50GHz
CPU Signature 306c2
Microcode Patch ffff0006
Max CPU Speed 2500 MHz
Min CPU Speed 800 MHz
CPU Speed 2500 MHz
Processor Cores 4
Intel HT Technology Supported
Intel VT-x Technology Supported
Intel SMX Technology Supported
64-bit Supported
EIST Technology Supported
CPU C3 State Supported
CPU C6 State Supported
CPU C7 State Supported
L1 Data Cache 32 kB x 4
L1 Code Cache 32 kB x 4
L2 Cache 256 kB x 4
L3 Cache 8192 kB
Enabled for WIndows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.
→←: Select Screen
↑↓: Select Item
Enter: Select Item
+/-: Change Opt.
Version 2.15.1236. Copyright (C) 2013 American Megatrends, Inc.

Navigate to the second page of the screen to see the rest of items in this menu by pressing the Up or Down arrow keys.

To quickly go to the last item of the second page, press the **Page Down** button. Press the **Page Up** button to go back to the first item in the first page.



### Hyper-threading [Enabled]

Allows you to enable or disable the Intel Hyper-Threading Technology function.

Configuration options: [Enabled] [Disabled]

### Active Processor Cores [All]

Allows you to choose the number of CPU cores to activate in each processor package. Configuration options: [All] [1] [2] [3]

### Execute Disable Bit [Enabled]

Allows you to enable or disable the XD feature that can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS. Configuration options: [Enabled][Disabled]

### Intel Virtualization Technology [Enabled]

Allows you to utilize the additional hardware capabilities provided by Vanderpool Technology. Configuration options: [Enabled] [Disabled]

### Hardware Prefetcher [Enabled]

Allows you to enable or disable the Mid Level Cache (L2) streamer. Configuration options: [Enabled] [Disabled]

### Adjacent Cache Line Prefetch [Enabled]

Allows you to enable or disable the Mid Level Cache (L2) prefetching of adjacent cache lines. Configuration options: [Enabled] [Disabled]

### CPU AES [Enabled]

Allows you to enable or disable the CPU Advance Encryption Standard instructions.

Configuration options: [Disabled] [Enabled]

### Boot performance mode [Turbo Performance]

This item allows you to select the performance state that the BIOS will set before OS handoff. Configuration options: [Max Non-Turbo Performace] [Max Battery] [Turbo Performance]

### EIST [Enabled]

Allows you to enable or disable the Enhanced Intel SpeedStep Technology (EIST).

Configuration options: [Enabled] [Disabled]

### Turbo Mode [Enabled]

This item appears only when you set the EIST item to [Enabled]. This allows you to enable or disable the Intel® Turbo Mode Technology.

Configuration options: [Enabled] [Disabled]

### Energy Performance [Performance]

Allows you to optimize between performance and power savings. Configuration options: [Performance] [Balanced Performance] [Balanced Energy] [Energy Efficient]

### CPU C states [Enabled]

Allows you to enable or disable the CPU C states. Configuration options: [Enabled] [Disabled]

This following items appears only when you set the CPU C states to [Enabled].

***Enhanced C1 State [Enabled]***
This item allows you to enable or disable the Enhanced C1 state. Configuration options: [Enabled] [Disabled]

***CPU C3 Report [Enabled]***
Allows you to enable or disable the CPU C3 report to OS. Configuration options: [Enabled] [Disabled]

***CPU C6 Report [Enabled]***
Allows you to enable or disable the CPU C6 report to OS. Configuration options: [Disabled] [Enabled]

***CPU C7 Report [CPU C7s]***
Allows you to enable or disable the CPU C7 report to OS. Configuration options: [Disabled] [CPU C7] [CPU C7s]

***C1 state auto demotion [Enabled]***
Allows you to enable or disable the demotion of the C3/C6/C7 request to C1 based on uncore auto-demote information. Configuration options: [Disabled] [Enabled]

***C3 state auto demotion [Enabled]***
Allows you to enable or disable the demotion of the C6/C7 request to C3 based on uncore auto-demote information. Configuration options: [Disabled] [Enabled]

### Package C State limit [AUTO]

Allows you set the Package C State limit to AUTO. Configuration options: [C0/C1] [C2] [C3] C6] [C7] [C7s] [AUTO]

### LakeTiny Feature [Disabled]

Allows you enable or disable LakeTiny for C state configuration. Configuration options: [Disabled] [Enabled]

### Intel TXT (LT) Suppot [Disabled]

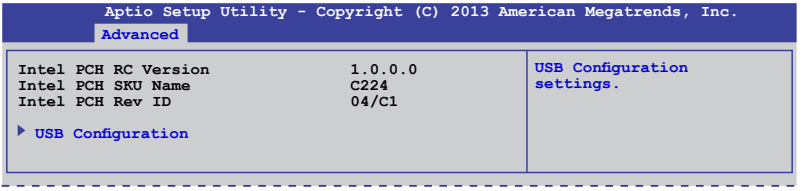
Allows you to enable or disable the Intel TXT (LT) support. Configuration options: [Disabled] [Enabled]

### ACPI T State [Disabled]

Allows you to enable or disable the ACPI T state. Configuration options: [Disabled] [Enabled]

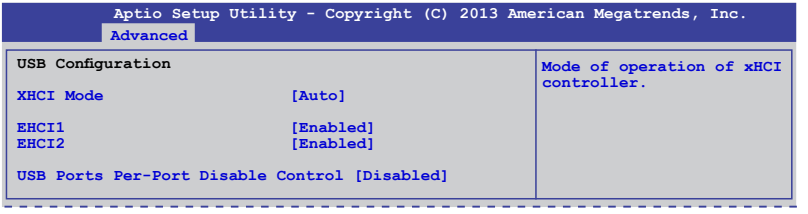
## 5.4.2 PCH-IO Configuration

Allows you to configure PCH parameters.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
Intel PCH RC Version 1.0.0.0
Intel PCH SKU Name C224
Intel PCH Rev ID 04/C1
USB Configuration
USB Configuration settings.

### USB Configuration

Allows you to set the USB Configuration settings.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
USB Configuration
XHCI Mode [Auto]
EHCI1 [Enabled]
EHCI2 [Enabled]
USB Ports Per-Port Disable Control [Disabled]
Mode of operation of xHCI controller.

### XHCI Mode [Auto]

Allows you to set the mode of operation of the xHCI controller. Configuration options: [Auto] [Enabled] [Disabled]

### EHCI1 / EHCI2 [Enabled]

Allows you to control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled. Configuration options: [Disabled] [Enabled]

### USB Ports Per-Port Disable Control [Disabled]

Allows you to control the disabling of the USB ports (0-13). Configuration options:

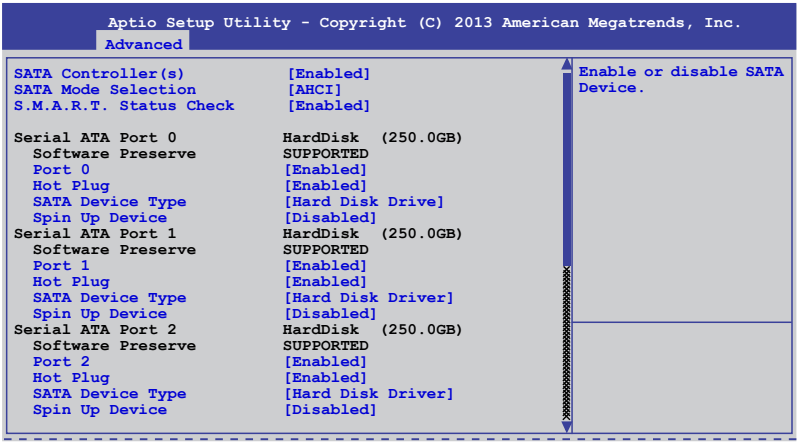
[Disabled] [Enabled]

#### USB Port #0-#13 Disable [Enabled]

This items only appears when you set the USB Ports Per-Port Disable Control to [Enabled] This item allows you to control the disabling of each of the USB ports (0-13). Configuration options: [Disabled] [Enabled]

## 5.4.3 SATA Configuration

While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show Not Present if no SATA device is installed to the corresponding SATA port.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
SATA Controller(s) [Enabled]
SATA Mode Selection [AHCI]
S.M.A.R.T. Status Check [Enabled]
Serial ATA Port 0 HardDisk (250.0GB)
Software Preserve SUPPORTED
Port 0 [Enabled]
Hot Plug [Enabled]
SATA Device Type [Hard Disk Drive]
Spin Up Device [Disabled]
Serial ATA Port 1 HardDisk (250.0GB)
Software Preserve SUPPORTED
Port 1 [Enabled]
Hot Plug [Enabled]
SATA Device Type [Hard Disk Driver]
Spin Up Device [Disabled]
Serial ATA Port 2 HardDisk (250.0GB)
Software Preserve SUPPORTED
Port 2 [Enabled]
Hot Plug [Enabled]
SATA Device Type [Hard Disk Driver]
Spin Up Device [Disabled]
Enable or disable SATA Device.

### SATA Controller(s) [Enabled]

This allows you to enable or disable the SATA Device. Configuration options: [Enabled] [Disabled]

### SATA Mode Selection [AHCI]

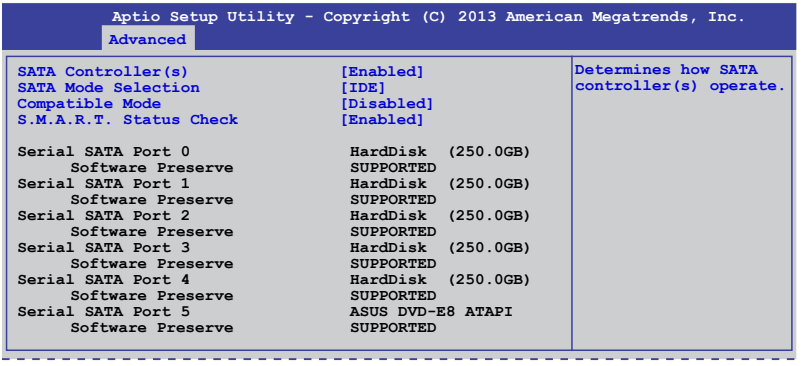
This allows you to choose how SATA controller(s) should operate. Configuration options: [AHCI] [IDE] [RAID]

### S.M.A.R.T. Status Check [Enabled]

Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.) is a monitor system. When read/write of your hard disk errors occur, this feature allows the hard disk to report warning messages during the POST. Configuration options: [Enabled] [Disabled]

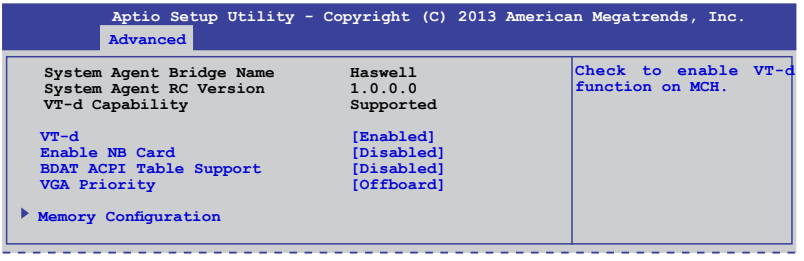
**Compatible Mode [Disabled]**

This item only appears when you set the SATA Mode Selection to [IDE]. This item allows you to enable or disable the Compatible mode. Configuration options: [Disabled] [Enabled]


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
SATA Controller(s) [Enabled]
SATA Mode Selection [IDE]
Compatible Mode [Disabled]
S.M.A.R.T. Status Check [Enabled]
Serial SATA Port 0 HardDisk (250.0GB)
Software Preserve SUPPORTED
Serial SATA Port 1 HardDisk (250.0GB)
Software Preserve SUPPORTED
Serial SATA Port 2 HardDisk (250.0GB)
Software Preserve SUPPORTED
Serial SATA Port 3 HardDisk (250.0GB)
Software Preserve SUPPORTED
Serial SATA Port 4 HardDisk (250.0GB)
Software Preserve SUPPORTED
Serial SATA Port 5 ASUS DVD-E8 ATAPI
Software Preserve SUPPORTED
Determines how SATA controller(s) operate.

## 5.4.4 System Agent (SA) Configuration

This allows you to change System Agent parameters.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
System Agent Bridge Name Haswell
System Agent RC Version 1.0.0.0
VT-d Capability Supported
VT-d [Enabled]
Enable NB Card [Disabled]
BDAT ACPI Table Support [Disabled]
VGA Priority [Offboard]
Memory Configuration
Check to enable VT-d function on MCH.

### VT-d [Enabled]

This allows you enable or disable the VT-d function on MCH. Configuration options: [Enabled] [Disabled]

### Enable NB CRID [Disabled]

This allows you enable or disable the NB CRID WorkAround. Configuration options: [Enabled] [Disabled]

### BDAT ACPI Table Support [Disabled]

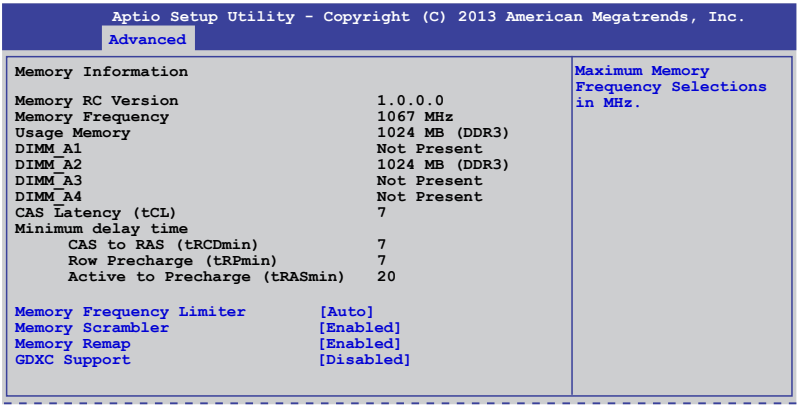
This allows you enable or disable the support for the BDAT ACPI table. Configuration options: [Enabled] [Disabled]

### VGA Priority [Offboard]

This allows you to prioritize between the onboard and offboard video device to be found. Configuration options: [Onboard] [Offboard]

## Memory Configuration

This allows you to change memory information settings.


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Advanced
Memory Information
Memory RC Version 1.0.0.0
Memory Frequency 1067 MHz
Usage Memory 1024 MB (DDR3)
DIMM_A1 Not Present
DIMM_A2 1024 MB (DDR3)
DIMM_A3 Not Present
DIMM_A4 Not Present
CAS Latency (tCL) 7
Minimum delay time
CAS to RAS (tRCDmin) 7
Row Precharge (tRPmin) 7
Active to Precharge (tRASmin) 20
Memory Frequency Limiter [Auto]
Memory Scrambler [Enabled]
Memory Remap [Enabled]
GDXC Support [Disabled]
Maximum Memory Frequency Selections in MHz.

### Memory Frequency Limiter [Auto]

This allows you to set the memory frequency in MHz. Configuration options: [Auto] [1333] [1600]

### Memory Scrambler [Enabled]

This allows you to enable or disable the Memory Scrambler support. Configuration options: [Enabled] [Disabled]

### Memory Remap [Enabled]

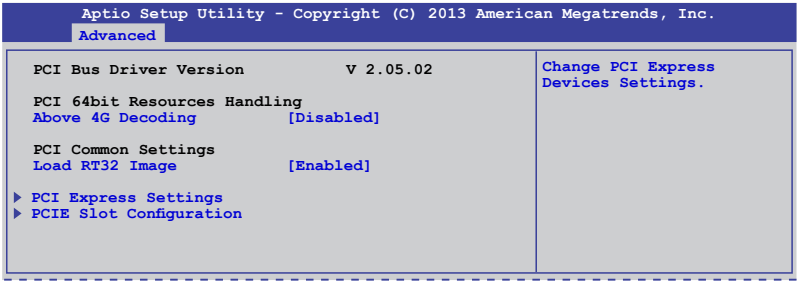
This allows you to enable or disable the Memory Remap above 4G. Configuration options: [Enabled] [Disabled]

### GDXC Support [Disabled]

This allows you to enable or disable the GDXC feature. Configuration options: [Enabled] [Disabled]

## 5.4.5 PCI Subsystem Settings

Allows you to configure PCI, PCI-X, and PCI Express Settings.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
PCI Bus Driver Version V 2.05.02
PCI 64bit Resources Handling
Above 4G Decoding [Disabled]
PCI Common Settings
Load RT32 Image [Enabled]
PCI Express Settings
PCIE Slot Configuration
Change PCI Express Devices Settings.

### Above 4G Decoding [Disabled]

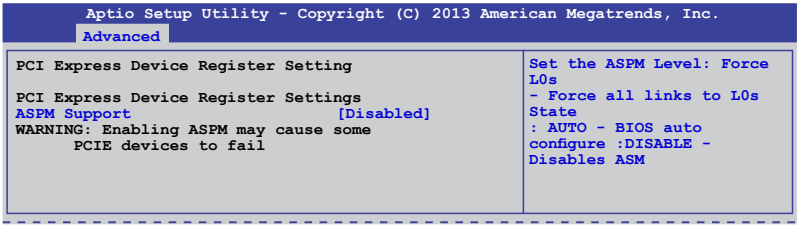
This item allows you to enable or disable 64-bit capable devices to be decoded in above 4G Address Space if your system supports 64-bit PCI decoding. Configuration Options: [Disabled][Enabled]

### Load RT32 Image [Enabled]

Allows you to enable or disable the RT32 Image Loading. Configuration Options: [Disabled][Enabled]

### PCI Express Settings

Allows you to change the settings of the PCI Express Devices.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
PCI Express Device Register Setting
PCI Express Device Register Settings
ASPM Support [Disabled]
WARNING: Enabling ASPM may cause some PCIE devices to fail
Set the ASPM Level: Force L0s - Force all links to L0s State : AUTO - BIOS auto configure :DISABLE - Disables ASM

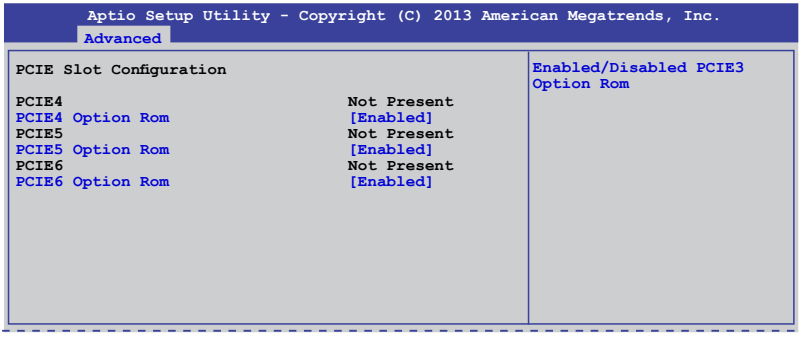
### ASPM Support [Disabled]

This item allows you to enable or disable support to Active State Power Management (ASPM). ASPM is a power management protocol that is used to extend battey life. Configuration options:

| | |
|---|---|
| [Disabled] | Disables ASMP |
| [Auto] | BIOS auto configure |
| [Force L0s] | Force all links to L0s State |

### PCIE Slot Configuration

Allows you to perform PCIE slot configurations.

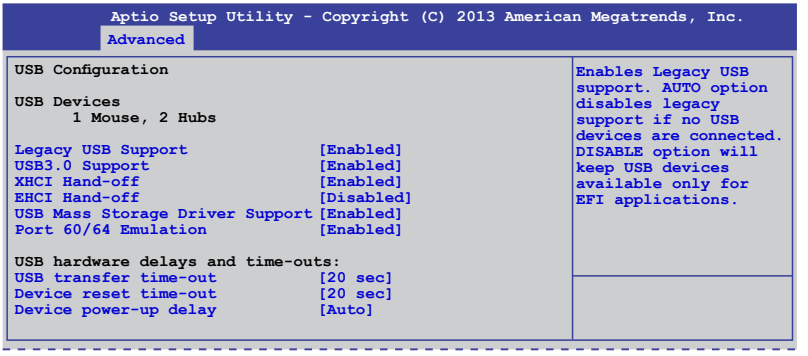



### PCIE Option Rom 4 - 6 [Enabled]

Allows you to enable or disable the PCIE slots. Configuration Options: [Disabled][Enabled]

## 5.4.6 USB Configuration

This allows you to make changes on the configuration settings of the USB.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
USB Configuration
USB Devices
1 Mouse, 2 Hubs
Legacy USB Support [Enabled]
USB3.0 Support [Enabled]
XHCI Hand-off [Enabled]
EHCI Hand-off [Disabled]
USB Mass Storage Driver Support [Enabled]
Port 60/64 Emulation [Enabled]
USB hardware delays and time-outs:
USB transfer time-out [20 sec]
Device reset time-out [20 sec]
Device power-up delay [Auto]
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

The USB Devices item shows the auto-detected values. If no USB device is detected, the item shows None.

### Legacy USB Support [Enabled]

Allows you to enable or disable the support for legacy USB devices. Setting to [Auto] allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled. Configuration options: [Disabled] [Enabled] [Auto]

### USB3.0 Support [Enabled]

Enables or disables the USB3.0 (XHCI) controller support. Configuration options: [Disabled] [Enabled]

### XHCI Hand-off [Enabled]

This functions as a workaround for OSes without XHCI hand-off support. Configuration options: [Disabled] [Enabled]

### EHCI Hand-off [Enabled]

This functions as a workaround for OSes without EHCI hand-off support. Configuration options: [Disabled] [Enabled]

### USB Mass Storage Driver Support [Enabled]

This allows you to enable or disable the USB Mass Storage driver support. Configuration options: [Disabled] [Enabled]

### Port 60/64 Emulation [Enabled]

This allows you to enable the I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes. Configuration options: [Disabled] [Enabled]

### USB transfer time-out [20 sec]

Allows you to select the USB transfer time-out value. Configuration options:

[1 sec] [5 sec] [10 sec] [20 sec]

### Device reset time-out [20 sec]

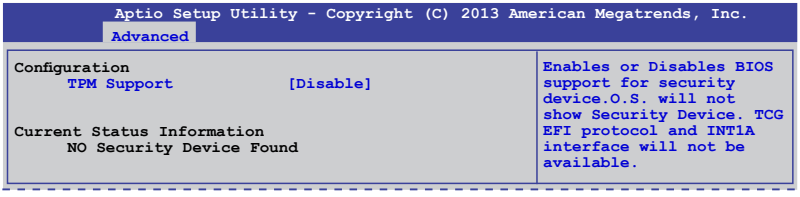
Allows you to select the USB device reset time-out value. Configuration options:

[10 sec] [20 sec] [30 sec] [40 sec]

### Device power-up delay [Auto]

This allows you to set the maximum time the device will take before it properly reports itself to the Host Controller. Configuration options: [Auto] [Manual]

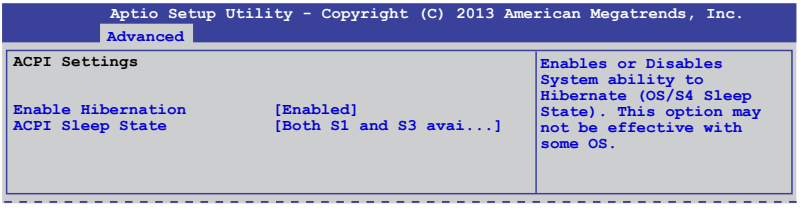
## 5.4.7 TPM


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
Configuration
TPM Support [Disable]
Current Status Information
NO Security Device Found
Enables or Disables BIOS support for security device.O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

### Security Device Support [Disabled]

Allows you to enable or disable BIOS support for security devices. Configuration options: [Disabled] [Enabled]

## 5.4.8 ACPI Settings


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
ACPI Settings
Enable Hibernation [Enabled]
ACPI Sleep State [Both S1 and S3 avai...]
Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some OS.

### Enable Hibernation [Enabled]

Allows you to enable or disable the Hibernation feature (OS/S4 sleep state).

Configuration options: [Disabled] [Enabled]

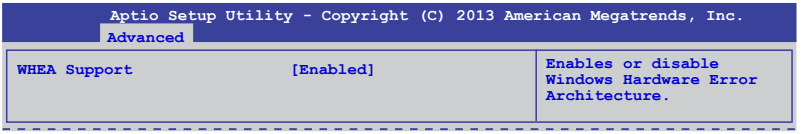
### ACPI Sleep State [Both S1 and S3 available for OS to choose from]

Allows you to set the ACPI Sleep state. Configuration options: [Suspend Disabled]

[S1 only (CPU Stop Clock)] [S3 only (Suspend to RAM)]

[Both S1 and S3 available for OS to choose from]

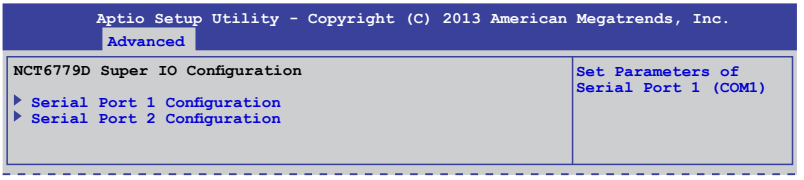
## 5.4.9 WHEA Support


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
WHEA Support [Enabled]
Enables or disable Windows Hardware Error Architecture.

### WHEA [Enabled]

Allows you to enable or disable the Windows® Hardware Error Architecture (WHEA) support. Configuration options: [Disabled] [Enabled]

## 5.4.10 NCT6779D Super IO Configuration


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
NCT6779D Super IO Configuration
Serial Port 1 Configuration
Serial Port 2 Configuration
Set Parameters of Serial Port 1 (COM1)

### Serial Port 1/2 Configuration

The sub-items in this menu allows you to set the parameters of the Serial Port 1 (COM1) and the Serial Port 2 (COM2).

#### Serial Port [Enabled]

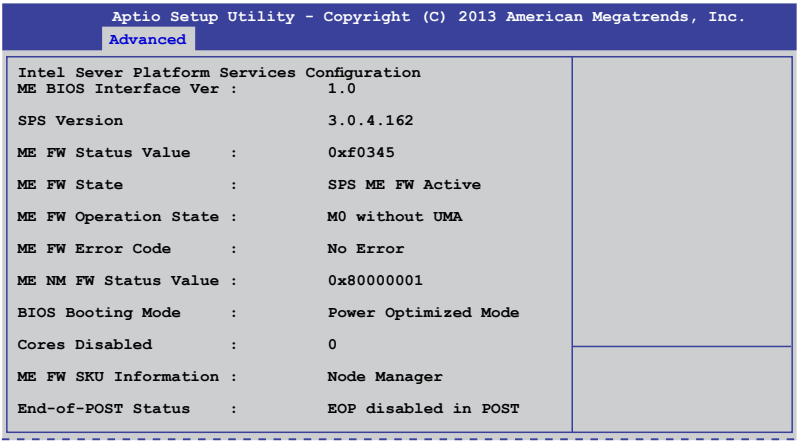
Allows you to enable or disable the serial port (COM 1/2). Configuration options: [Enabled] [Disabled]

#### Change Settings [Auto]

This item only appears when you set the Serial Port to [Enabled]. This item allows you to select the serial port base address. Configuration options:
[Auto]
[IO=3F8h; IRQ=4]
[IO=3F8h: IRQ=3, 4, 5, 6, 7, 10, 11, 12]
[IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12]
[IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12]
[IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12]
[IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12]

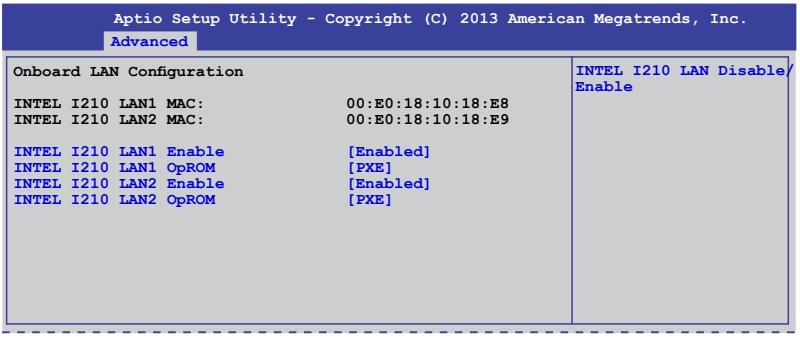
## 5.4.11 Intel Server Platform Services

This item displays the information of the Intel Server Platform Services configured in the system.


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Advanced
Intel Sever Platform Services Configuration
ME BIOS Interface Ver : 1.0
SPS Version 3.0.4.162
ME FW Status Value : 0xf0345
ME FW State : SPS ME FW Active
ME FW Operation State : M0 without UMA
ME FW Error Code : No Error
ME NM FW Status Value : 0x80000001
BIOS Booting Mode : Power Optimized Mode
Cores Disabled : 0
ME FW SKU Information : Node Manager
End-of-POST Status : EOP disabled in POST

## 5.4.12 Onboard LAN Configuration

This item allows you to change the enable or disable the onboard BCM57840S LAN.


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Advanced
Onboard LAN Configuration
INTEL I210 LAN Disable/ Enable
INTEL I210 LAN1 MAC: 00:E0:18:10:18:E8
INTEL I210 LAN2 MAC: 00:E0:18:10:18:E9
INTEL I210 LAN1 Enable [Enabled]
INTEL I210 LAN1 OpROM [PXE]
INTEL I210 LAN2 Enable [Enabled]
INTEL I210 LAN2 OpROM [PXE]

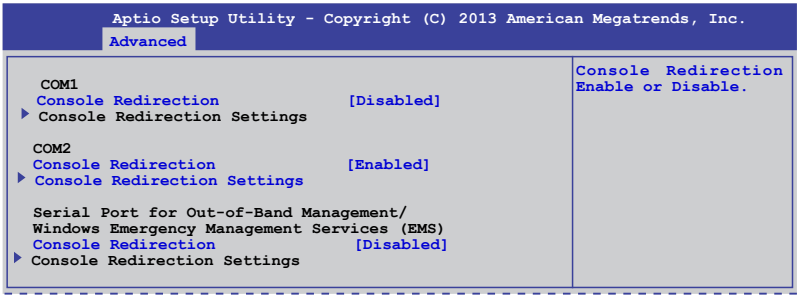
### INTEL I210 LAN1 - LAN2 Enable [Enabled]

Allows you to enable or disable the INTEL I210 LAN function in the system. Configuration Options: [Enabled] [Disabled]

### INTEL I210 LAN1 - LAN2 OpROM [PXE]

Allows you to launch the INTEL I210 LAN OpROM. Configuration Options: [Disabled] [PXE] [iSCSI]

## 5.4.13 Serial Port Console Redirection




### COM1/COM2 Console Redirection [Disabled/Enabled]

Allows you to enable or disable the console redirection feature. Configuration options: [Disabled] [Enabled]

The **Console Redirection Settings** becomes configurable when **Console Redirection** is set to [Enabled].

### COM1/COM2 Console Redirection Settings

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

**Terminal Type [VT-UTF8]**

Allows you to set the terminal type.

| | |
|---|---|
| [VT100] | ASCII char set. |
| [VT100+] | Extends VT100 to support color, function keys, among others |
| [VT-UTF8] | Uses UTF8 encoding to map Unicode chars onto 1 or more bytes |
| [ANSI] | Extended ASCII char set |

**Bits per second [57600]**

Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds. Configuration options: [9600] [19200] [38400] [57600] [115200]

**Data Bits [8]**

Allows you to set the data bits. Configuration options: [7] [8]

**Parity [None]**

Allows you to select the parity bit. A parity bit is sent with the data bits to detect transmission errors. Configuration options: [None] [Even] [Odd] [Mark] [Space]

**Stop Bits [1]**

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning.) The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. Configuration options: [1] [2]

**Flow Control [Hardware RTS/CTS]**

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Once the buffers are empty, a “start” signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. Configuration options: [None] [Hardware RTS/CTS]

**VT -UTF8 Combo Key Support [Enabled]**

This allows you to enable the VT -UTF8 Combination Key Support for ANSI/VT100 terminals. Configuration options: [Disabled] [Enabled]

**Recorder Mode [Disabled]**

This allows you to enable or disable the Recorded mode to capture Terminal data. Configuration options: [Disabled] [Enabled]

**Resolution 100x31 [Enabled]**

This allows you to enable or disable the extended terminal resolution. Configuration options: [Disabled] [Enabled]

**Legacy OS Redirection Resolution [80x24]**

This allows you to set the number of rows and columns supported on the Legacy OS. Configuration options: [80x24] [80x25]

**Putty Keypad [VT100]**

This allows you to select the FunctionKey and Keypad on Putty. Configuration options: [VT100] [LINUX] [XTERMR6] [SCO] [ESCN] [VT400]

**Redirection After BIOS POST [Bootloader]**

This setting allows you to specify if Bootloader is selected than Legacy console redirection. Configuration options: [Always Enable] [Bootloader]

### Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS) Settings

The following items only appears when you set the **Console Redirection** to [Enabled].

**Out-of-Band Mgmt Port [COM1]**

Allows remote management of a Windows Server OS through a serial port. Configuration options: [COM1] [COM2]

**Terminal Type [VT-UTF8]**

Allows you to set the terminal type for out-of-band management. Configuration options:

| | |
|---|---|
| [VT100] | ASCII char set. |
| [VT100+] | Extends VT100 to support color, function keys, et. |
| [VT-UTF8] | Uses UTF8 encoding to map Unicode chars onto 1 or more bytes |
| [ANSI] | Extended ASCII char set |

**Bits per second [115200]**

Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds. Configuration options: [9600] [19200] [57600] [115200]

**Flow Control [None]**

Allows you to set the flow control to prevent data loss from buffer overflow. Configuration options: [None] [Hardware RTS/CTS] [Software Xon/Xoff]

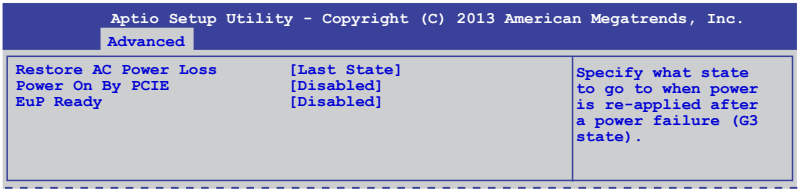
## 5.4.14 Runtime Error Logging Support

### Runtime Error Logging Support [Disabled]

Allows you to enable or disable the Runtime Error Logging Support. Configuration options: [Disabled] [Enabled]

## 5.4.15 APM

Allows you to configure the Advance Power Management (APM) settings.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
Restore AC Power Loss [Last State]
Power On By PCIE [Disabled]
EuP Ready [Disabled]
Specify what state to go to when power is re-applied after a power failure (G3 state).

### Restore AC Power Loss [Last State]

Allows you to set the state the system will go to after an AC power loss. Configuration options: [Power Off] [Power On] [Last State]

### Power On By PCIE [Disabled]

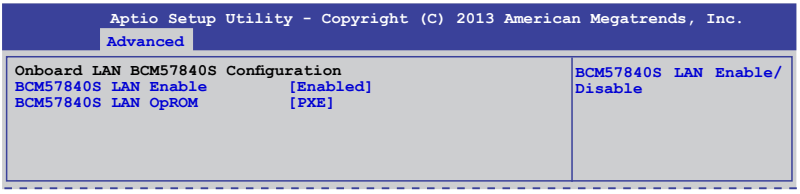
This allows you to enable or diasble the PCIE devices to generate a wake event. Configuration options: [Disabled] [Enabled]

### EUP Ready [Disabled]

This item allows you to switch off some power at S5 to get the system ready for EuP requirement. Configuration options: [Enabled] [Disabled]

## 5.4.16 Onboard LAN BCM57840S Configuration

Allows you to configure the onboard LAN BCM57840S.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
Onboard LAN BCM57840S Configuration
BCM57840S LAN Enable [Enabled]
BCM57840S LAN OpROM [PXE]
BCM57840S LAN Enable/ Disable

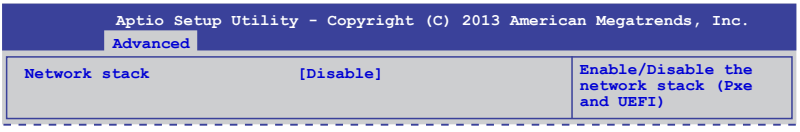
### BCM57840S LAN Enable [Enabled]

Allows you to enable or disable the onboard BCM57840S LAN. Configuration options: [Enabled] [Disabled]

### BCM57840S LAN OpROM [PXE]

Allows you to disable BCM57840S LAN OpROM or select between iSCSI or PXE. Configuration options: [Disabled] [PXE] [iSCSI]

## 5.4.17 Network Stack


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
Network stack [Disable]
Enable/Disable the network stack (Pxe and UEFI)

### Network stack [Disable]

Enables or disables the network stack feature. Configuration options: [Disable] [Enable]

Network stack [Enabled]

The following items only appears when you set Network Stack to **[Enabled].**

### Ipv4 PXE Support [Enabled]

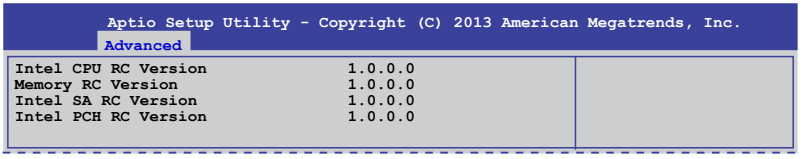
Enables or disables the Ipv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created. Configuration options: [Disabled] [Enabled].

### Ipv6 PXE Support [Enabled]

Enables or disables the Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot option will not be created. Configuration options: [Disabled] [Enabled].

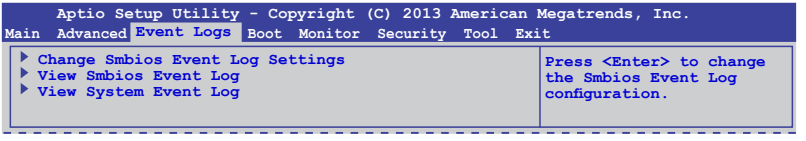
### 5.4.18 Intel RC Drivers Version Detail

This item displays the Version String for the Intel RC Drivers.

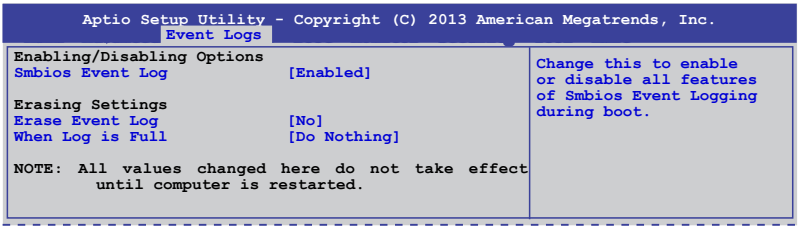

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
Intel CPU RC Version 1.0.0.0
Memory RC Version 1.0.0.0
Intel SA RC Version 1.0.0.0
Intel PCH RC Version 1.0.0.0

## 5.5 Event Logs menu

The Event Logs menu items allow you to change the event log settings and view the system event logs.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Event Logs Boot Monitor Security Tool Exit
Change Smbios Event Log Settings
View Smbios Event Log
View System Event Log
Press <Enter> to change the Smbios Event Log configuration.

### Change Smbios Event Log Settings


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Event Logs
Enabling/Disabling Options
Smbios Event Log [Enabled]
Erasing Settings
Erase Event Log [No]
When Log is Full [Do Nothing]
NOTE: All values changed here do not take effect until computer is restarted.
Change this to enable or disable all features of Smbios Event Logging during boot.

**Smbios Event Log [Enabled]**

Allows you to enable or disable all features of Smbios event logging during boot. Configuration options: [Disabled] [Enabled]

**Erase Event Log [No]**

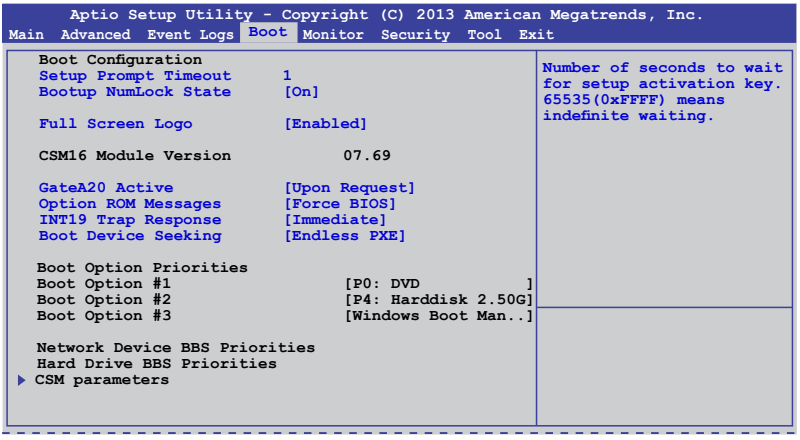
This item only appears when Smbios Event Log is set to [Enabled]. This item allows you to select the options for erasing Smbios event log. Configuration options: [No] [Yes, Next reset] [Yes, Every reset]

**When Log is Full [Do Nothing]**

This item only appears when Smbios Event Log is set to [Enabled]. This item allows you to select the options for reaction when the event logs are full. Configuration options: [Do Nothing] [Erase Immediately]

## 5.6 Boot menu

The items in Boot menu allows you to change the options on how the system will boot.


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Event Logs Boot Monitor Security Tool Exit
Boot Configuration
Setup Prompt Timeout 1
Bootup NumLock State [On]
Full Screen Logo [Enabled]
CSM16 Module Version 07.69
GateA20 Active [Upon Request]
Option ROM Messages [Force BIOS]
INT19 Trap Response [Immediate]
Boot Device Seeking [Endless PXE]
Boot Option Priorities
Boot Option #1 [P0: DVD ]
Boot Option #2 [P4: Harddisk 2.50G]
Boot Option #3 [Windows Boot Man..]
Network Device BBS Priorities
Hard Drive BBS Priorities
CSM parameters
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

### Setup Prompt Timeout [xx]

This item allows you to adjust the number of seconds to wait for setup activation key. Use the <+> and <-> keys to specify the values.

### Bootup NumLock State [On]

Allows you to select the power-on state for the NumLock. Configuration options: [Off] [On]

### Full Screen Logo [Enabled]

Allows you to enable or disable the full screen logo display feature. Configuration options: [Disabled] [Enabled].

Set the **Full Screen Logo** to [Enabled] to use the ASUS MyLogo2™ feature.

### GateA20 Active [Upon Request]

This item is useful when any RT code is execute above 1MB. When set to [Upon Request], the GA20 can be disabled using BIOS services. When set to [Always], disabling of GA20 is not allowed. Configuration options: [Upon Request] [Always].

### Option ROM Messages [Force BIOS]

Allows you to set the display mode for Option ROM. Configuration options:

[Force BIOS] [Keep Current]

### INT19 Trap Response [Immediate]

This item allows you to set the BIOS reaction on INT19 trapping by Option ROM. Configuration options: [Immediate] [Postponed]

### Boot Device Seeking [Endless PXE]

This allows you to enable the Boot Device Seeking option. Configuration options:

[Endless PXE] Continuosly seek remote boot image until boot image is found or the operation is aborted <Ctrl>+<Alt>+<Del> is pressed by the user).

[Normal] Seek remote boot image once then stop.

### Boot Option Priorities

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

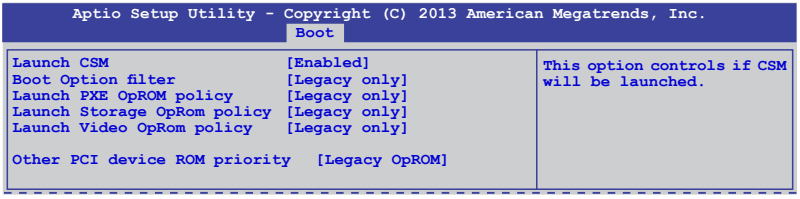
- To select the boot device during system startup, press <F8> when ASUS Logo appears.
- To access Windows® OS in Safe Mode, do any of the following:
  - Press <F5> when ASUS Logo appears.
  - Press <F8> after POST.

### Network Device BBS Priorities / Hard Drive BBS Priorities

This allows you to set the order of the legacy devices in this group.

## CSM Parameters

This allows you to set OpROM execution, boot options filter, and other OpROM settings settings.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Boot
Launch CSM [Enabled]
Boot Option filter [Legacy only]
Launch PXE OpROM policy [Legacy only]
Launch Storage OpRom policy [Legacy only]
Launch Video OpRom policy [Legacy only]
Other PCI device ROM priority [Legacy OpROM]
This option controls if CSM will be launched.

**Launch CSM [Enabled]**

This option allows you to enable or disable the launch of CSM. Configuration options: [Disabled] [Enabled]

**Boot Option filter [Legacy only]**

This option allows you to control what devices the system can boot to. Configuration options: [UEFI and Legacy] [Legacy only] [UEFI only]

**Launch PXE OpROM policy [Legacy only]**

This option allows you to control the execution of UEFI and Legacy PXE OpROM. Configuration options: [Do not launch] [UEFI only] [Legacy only] [Legacy first] [UEFI first]

**Launch Storage OpROM policy [Legacy only]**

This option allows you to control the execution of UEFI and Legacy Storage OpROM. Configuration options: [Do not launch] [UEFI only] [Legacy only] [Legacy first] [UEFI first]

**Launch Video OpROM policy [Legacy only]**

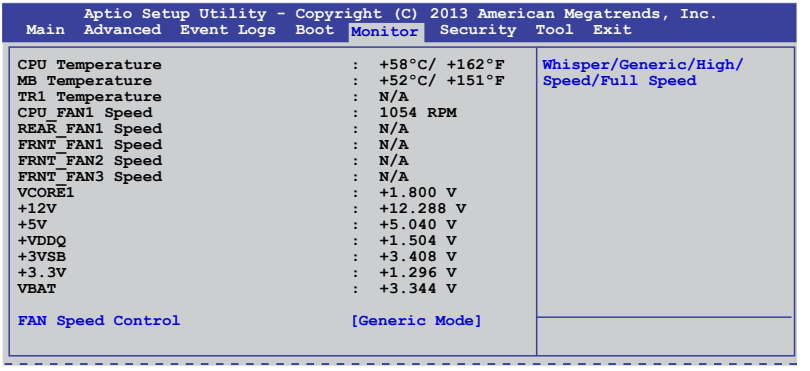
This option allows you to control the execution of UEFI and Legacy Storage OpROM. Configuration options: [Do not launch] [UEFI only] [Legacy only] [Legacy first] [UEFI first]

**Other PCI device ROM priority [Legacy OpROM]**

This option allows you to control the execution of UEFI and Legacy Storage OpROM. Configuration options: [UEFI OpROM] [Legacy OpROM]

## 5.7 Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Event Logs Boot Monitor Security Tool Exit
CPU Temperature : +58°C/ +162°F
MB Temperature : +52°C/ +151°F
TR1 Temperature : N/A
CPU_FAN1 Speed : 1054 RPM
REAR_FAN1 Speed : N/A
FRNT_FAN1 Speed : N/A
FRNT_FAN2 Speed : N/A
FRNT_FAN3 Speed : N/A
VCORE1 : +1.800 V
+12V : +12.288 V
+5V : +5.040 V
+VDDQ : +1.504 V
+3VSB : +3.408 V
+3.3V : +1.296 V
VBAT : +3.344 V
FAN Speed Control [Generic Mode]
Whisper/Generic/High/ Speed/Full Speed

### CPU/MB/TR1 Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the CPU and motherboard component temperatures.

### CPU_FAN1 Speed; FRNT_FAN1–3 Speed; REAR_FAN1 Speed [xxxx RPM] or [Ignore] / [N/A]

The onboard hardware monitor automatically detects and displays the speed of CPU fans, front fans, and rear fan in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows N/A.

### VCORE1 Voltage: +12V, +5V, +VDDQ, +3VSB, +3.3V, and VBAT

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators.

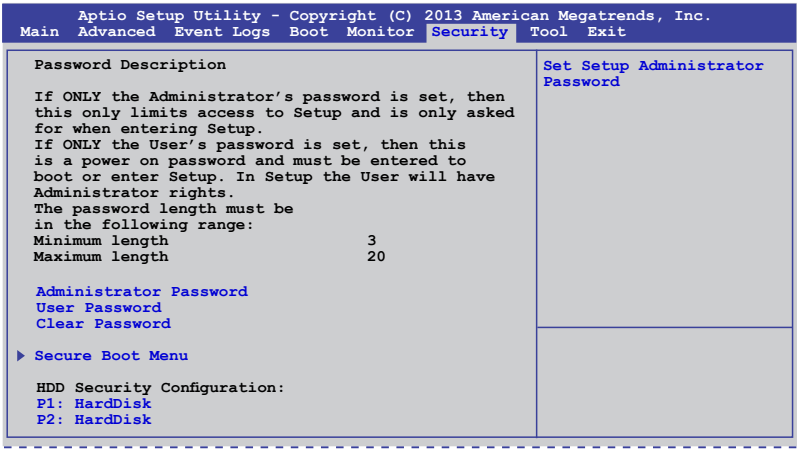
### Fan Speed Control [Generic Mode]

Allows you to configure the ASUS Smart Fan feature that smartly adjusts the fan speeds for more efficient system operation. Configuration options:

[Low Speed Mode] [Generic Mode] [High Speed Mode] [Full Speed Mode]

## 5.8 Security

This menu allows a new password to be created or a current password to be cchanged. The menu also enables or disables the Secure Boot state and lets the user configure the System Mode state.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Event Logs Boot Monitor Security Tool Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Clear Password
Secure Boot Menu
HDD Security Configuration:
P1: HardDisk
P2: HardDisk
Set Setup Administrator Password

### Administrator Password

To set an administrator password:

1. Select the Administrator Password item and press <Enter>.
2. From the Create New Password box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change an administrator password:

1. Select the Administrator Password item and press <Enter>.
2. From the Enter Current Password box, key in the current password, then press <Enter>.
3. From the Create New Password box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password.

### User Password

To set a user password:

1. Select the User Password item and press <Enter>.
2. From the Create New Password box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change a user password:

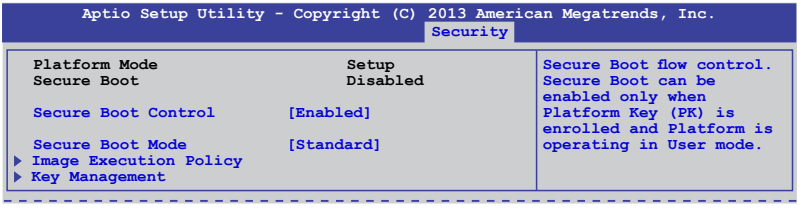
1. Select the User Password item and press <Enter>.
2. From the Enter Current Password box, key in the current password, then press <Enter>.
3. From the Create New Password box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear a user password:

1. Select the Clear User Password item and press <Enter>.
2. Select Yes from the Warning message window then press <Enter>.

### Secure Boot Menu

This item allows you to customize the Secure Boot settings.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Security
Platform Mode
Setup
Secure Boot
Disabled
Secure Boot Control
[Enabled]
Secure Boot Mode
[Standard]
Image Execution Policy
Key Management
Secure Boot flow control. Secure Boot can be enabled only when Platform Key (PK) is enrolled and Platform is operating in User mode.

### Secure Boot Control [Enabled]

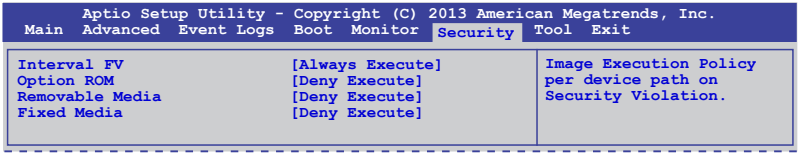
This item allows you to enable or disable the Secure Boot flow control. Configuration options: [Disabled] [Enabled]

### Secure Boot Mode [Standard]

This item allows you to select the mode of the Secure boot to change Execution policy and Secure Boot Key management. Configuration options: [Standard] [Custom]

## Image Execution Policy

This item only appears when you set the Secure Boot Mode to [Custom]. This allows you to manage the Image Policy on Security Violation.


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Event Logs Boot Monitor Security Tool Exit
Interval FV [Always Execute]
Option ROM [Deny Execute]
Removable Media [Deny Execute]
Fixed Media [Deny Execute]
Image Execution Policy per device path on Security Violation.

**Internal FV [Always Execute]**

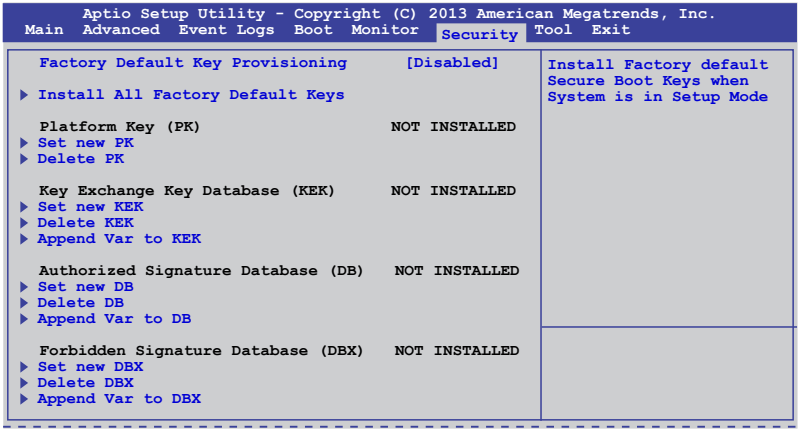
Configuration options: [Always Execute]

**Option ROM/Removable Media/Fixed Media [Deny Execute]**

Configuration options: [Always Execute] [Always Deny] [Allow Execute] [Defer Execute] [Deny Execute] [Query User]

## Key Management

This item only appears when you set the Secure Boot Mode to [Custom]. This allows you to modify Secure Boot variables and set Key Management page.


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Event Logs Boot Monitor Security Tool Exit
Factory Default Key Provisioning [Disabled]
Install All Factory Default Keys
Platform Key (PK) NOT INSTALLED
Set new PK
Delete PK
Key Exchange Key Database (KEK) NOT INSTALLED
Set new KEK
Delete KEK
Append Var to KEK
Authorized Signature Database (DB) NOT INSTALLED
Set new DB
Delete DB
Append Var to DB
Forbidden Signature Database (DBX) NOT INSTALLED
Set new DBX
Delete DBX
Append Var to DBX
Install Factory default Secure Boot Keys when System is in Setup Mode

**Factory Default Key Provisioning [Disabled]**

Configuration options: [Disabled] [Enabled]

**Install All Factory Default Keys**

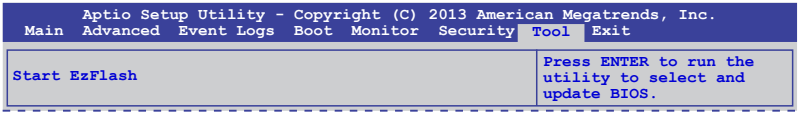
This item will ask you if you want to Install Factory Default secure variables. Select Yes if you want to load the default secure variables, otherwise select No.

**Platform Key (PK)/Key Exchange Key Database (KEK)/Authorized Signature Database (DB)/ Forbidden Signature Database (DBX)**

Configuration options: [Set New] [Delete] [Append]

## 5.9 Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.

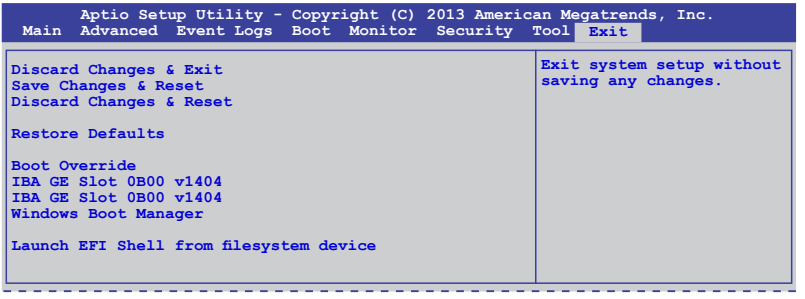

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Event Logs Boot Monitor Security Tool Exit
Start EzFlash
Press ENTER to run the utility to select and update BIOS.

### Start EzFlash utility

Allows you to run the Start EzFlash utility. For more information, see section **4.1.2 ASUS EzFlash utility**.

## 5.10 Exit menu

The Exit menu items allow you to save or discard your changes to the BIOS items.


Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Event Logs Boot Monitor Security Tool Exit
Discard Changes & Exit
Save Changes & Reset
Discard Changes & Reset
Restore Defaults
Boot Override
IBA GE Slot 0B00 v1404
IBA GE Slot 0B00 v1404
Windows Boot Manager
Launch EFI Shell from filesystem device
Exit system setup without saving any changes.

Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

### Discard Changes & Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select Yes to discard changes and exit.

### Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select Yes to save changes and exit.

### Discard Changes & Reset

This option allows you to reset without saving your changes. When you select this option or if you press <ENTER>, a confirmation window appears. Select Yes to discard changes and reset.

### Restore Defaults

This option allows you restore or load the default values for all the setup options. When you select this option or if you press <ENTER>, a confirmation window appears. Select Yes to apply the default values or press <Esc> to exit.

### Launch EFI Shell from filesystem device

This option allows you to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices. Select Yes to proceed, or No to cancel, and then press <Enter>.

# Chapter 6

This chapter provides instructions for setting up, creating and configuring RAID sets using the available utilities.

# RAID configuration

# 6.1 Setting up RAID

The motherboard comes with the Intel® C224 controller that supports the **Intel® Rapid Storage Technology enterprise Option ROM Utility** with RAID 0, RAID 1, RAID 10, and RAID 5 support (for Windows® OS only).

## 6.1.1 RAID definitions

**RAID 0** *(Data striping)* optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support DVD to a floppy disk before you install an operating system to the selected hard disk drive.

## 6.1.2 Installing hard disk drives

The motherboard supports Serial ATA for RAID set configuration. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for RAID configuration:

1. Install the SATA hard disks into the drive bays following the instructions in the system user guide.
2. Connect a SATA signal cable to the signal connector at the back of each drive and to the SATA connector on the motherboard.
3. Connect a SATA power cable to the power connector on each drive.

## 6.1.3 Setting Jumpers

Ensure to turn off power before setting the jumpers on the motherboard.

You must set the jumper settings of your motherboard to activate the embedded **Intel® Rapid Storage Technology enterprise SATA Option ROM Utility.**

To set the jumper settings for **Intel® Rapid Storage Technology enterprise SATA Option ROM Utility,** set the 3-pin RAID_SEL1 jumper to pins 2-3.
For more information about the jumper settings of 3-pin RAID_SEL1, you may refer to the **RAID configuration utility** section on page 2-27.

## 6.1.4 Setting the RAID mode in BIOS

You must set the RAID mode in the BIOS Setup to be able to launch the RAID utilities before you can create a RAID set from the SATA hard disk drives attached to the SATA connectors supported by Intel® C224 chipset.

To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Advanced** Menu > **SATA Configuration**, then press <Enter>.
3. Set **SATA Mode** to [RAID].
4. Press <F10> to save your changes and exit the BIOS Setup.

Refer to **Chapter 4** for details on entering and navigating through the BIOS Setup.

## 6.1.5 RAID configuration utilities

Depending on the RAID connectors that you use, you can create a RAID set using the utilities embedded in each RAID controller. For example, use the **Intel® Rapid Storage Technology enterprise SATA Option ROM Utility** if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the Intel® C224 chipset.

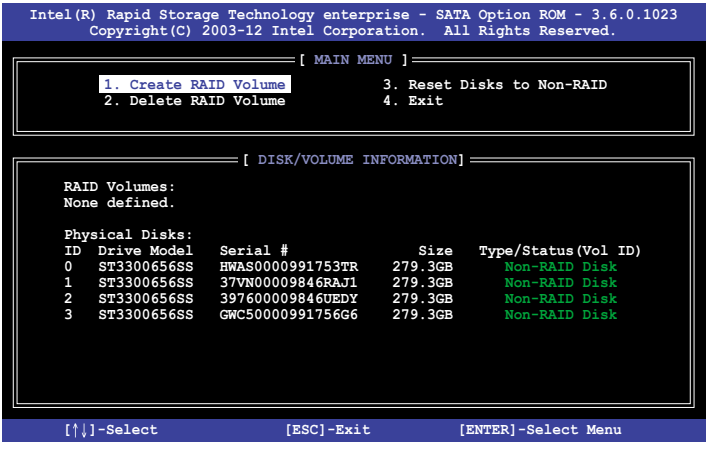
## 6.2 Intel® Rapid Storage Technology enterprise SATA Option ROM Utility

The Intel® Rapid Storage Technology enterprise SATA Option ROM utility allows you to create RAID 0, RAID 1, RAID 10 (RAID 1+0), and RAID 5 set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

Before you proceed, ensure that you have installed the Serial ATA hard disk drives, have set the correct jumper settings of the motherboard, and have set the correct SATA mode in the BIOS setup. You can refer to sections **5.1.2 Installing hard disk drives**, **5.1.3 Setting Jumpers**, and **5.1.4 Setting the RAID mode in BIOS** for more information.

To launch the Intel® Rapid Storage Technology enterprise SATA Option ROM utility:

1. Turn on the system.
2. During POST, press <Ctrl>+<I> to display the utility main menu.


Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
[ MAIN MENU ]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[ DISK/VOLUME INFORMATION]
RAID Volumes:
None defined.
Physical Disks:
ID Drive Model Serial # Size Type/Status(Vol ID)
0 ST3300656SS HWAS0000991753TR 279.3GB Non-RAID Disk
1 ST3300656SS 37VN00009846RAJ1 279.3GB Non-RAID Disk
2 ST3300656SS 397600009846UEDY 279.3GB Non-RAID Disk
3 ST3300656SS GWC50000991756G6 279.3GB Non-RAID Disk
[↑↓]-Select
[ESC]-Exit
[ENTER]-Select Menu

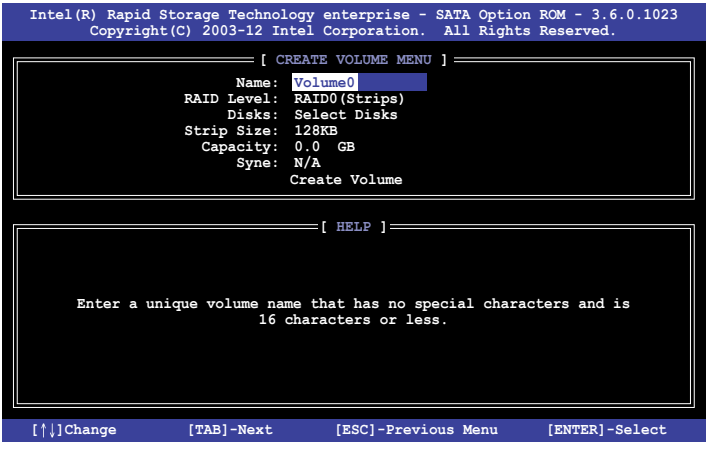
The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.

The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

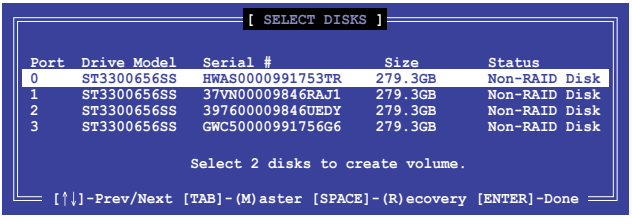
## 6.2.1 Creating a RAID set

To create a RAID set:

1. From the utility main menu, select **1. Create RAID Volume** and press <Enter>.
2. Key in a name for the RAID set from the following screen and press <Enter>.


Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
[ CREATE VOLUME MENU ]
Name: Volume0
RAID Level: RAID0(Strips)
Disks: Select Disks
Strip Size: 128KB
Capacity: 0.0 GB
Syne: N/A
Create Volume
[ HELP ]
Enter a unique volume name that has no special characters and is 16 characters or less.
[↑↓]Change
[TAB]-Next
[ESC]-Previous Menu
[ENTER]-Select

3. Press the up/down arrow keys to select a RAID Level that you wish to create then press <Enter>.
4. From the **Disks** item field, press <Enter> to select the hard disk drives that you want to include in the RAID set.


[ SELECT DISKS ]
Port Drive Model Serial # Size Status
0 ST3300656SS HWAS0000991753TR 279.3GB Non-RAID Disk
1 ST3300656SS 37VN00009846RAJ1 279.3GB Non-RAID Disk
2 ST3300656SS 397600009846UEDY 279.3GB Non-RAID Disk
3 ST3300656SS GWC50000991756G6 279.3GB Non-RAID Disk
Select 2 disks to create volume.
[↑↓]-Prev/Next [TAB]-(M)aster [SPACE]-(R)ecovery [ENTER]-Done

5. Use the up/down arrow keys to move the selection bar then press <Space> to select a disk. A small triangle before the Port number marks the selected drive. Press <Enter> when you are done.

6. Use the up/down arrow keys to select the stripe size for the RAID array (for RAID 0, 10 and 5 only) then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
RAID 0: 128KB
RAID 10: 64KB
RAID 5: 64KB

We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

7. In the Capacity field item, key in the RAID volume capacity that you want to use and press <Enter>. The default value indicates the maximum allowed capacity.

8. Press <Enter> to start creating the RAID volume.

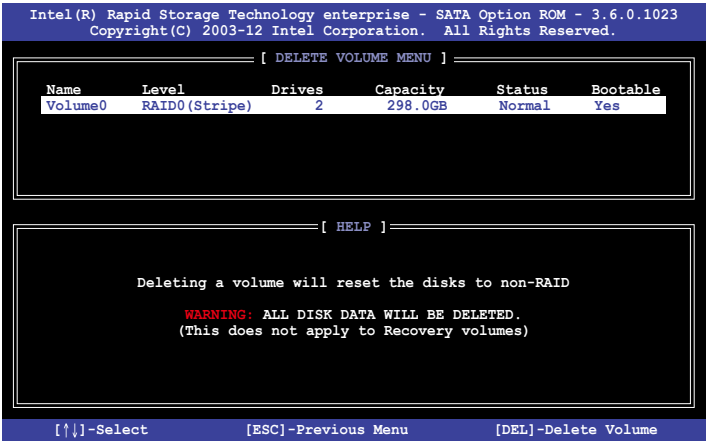
9. From the following warning message, press <Y> to create the RAID volume and return to the main menu, or press <N> to go back to the CREATE VOLUME menu

## 6.2.2 Deleting a RAID set

Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the utility main menu, select **2. Delete RAID Volume** and press <Enter>.
2. From the Delete Volume Menu, press the up/down arrow keys to select the RAID set you want to delete then press <Del>.


Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
[ DELETE VOLUME MENU ]
Name Level Drives Capacity Status Bootable
Volume0 RAID0(Stripe) 2 298.0GB Normal Yes
[ HELP ]
Deleting a volume will reset the disks to non-RAID
WARNING: ALL DISK DATA WILL BE DELETED.
(This does not apply to Recovery volumes)
[↑↓]-Select [ESC]-Previous Menu [DEL]-Delete Volume

3. From the following warning message, press <Y> to delete the RAID set and return to the utility main menu, or press <N> to return to the **DELETE VOLUME** menu.

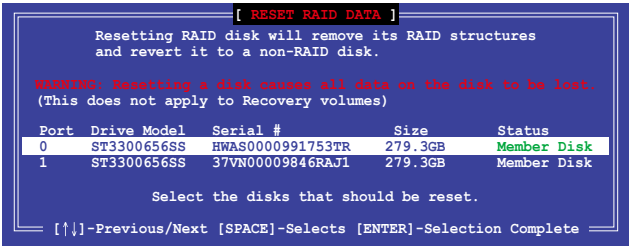
[ DELETE VOLUME VERIFICATION ]
ALL DATA ON THE VOLUME WILL BE LOST!
(This does not apply to Recovery volumes)
Are you sure you want to delete volume "Volume0"? (Y/N):

## 6.2.3 Resetting disks to Non-RAID

Take caution before you reset a RAID volume hard disk drive to non-RAID. Resetting a RAID volume hard disk drive deletes all internal RAID structure on the drive.

To reset a RAID set hard disk drive:

1. From the utility main menu, select **3. Reset Disks to Non-RAID** and press <Enter>.
2. Press the up/down arrow keys to select the drive(s) or disks of the RAID set you want to reset, then press <Space>. A small triangle before the Port number marks the selected drive. Press <Enter> when you are done.


[ RESET RAID DATA ]
Resetting RAID disk will remove its RAID structures
and revert it to a non-RAID disk.
WARNING: Resetting a disk causes all data on the disk to be lost.
(This does not apply to Recovery volumes)
Port Drive Model Serial # Size Status
0 ST3300656SS HWAS0000991753TR 279.3GB Member Disk
1 ST3300656SS 37VN00009846RAJ1 279.3GB Member Disk
Select the disks that should be reset.
[↑↓]-Previous/Next [SPACE]-Selects [ENTER]-Selection Complete

3. Press <Y> in the confirmation window to reset the drive(s) or press <N> to return to the utility main menu.

## 6.2.4 Exiting the Intel® Rapid Storage Technology enterprise SATA Option ROM utility

To exit the utility:

1. From the utility main menu, select 4. Exit then press <Enter>.
2. From the following warning message, press <Y> to exit or press <N> to return to the utility main menu.

## 6.2.5 Rebuilding the RAID

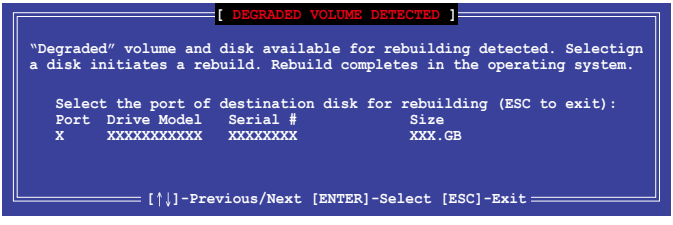
This option is only for the RAID 1 set.

### Rebuilding the RAID with other non-RAID disk

If any of the SATA hard disk drives included in the RAID 1 array failed, the system displays the status of the RAID volume as “Degraded” during POST. You can rebuild the RAID array with other installed non-RAID disks.

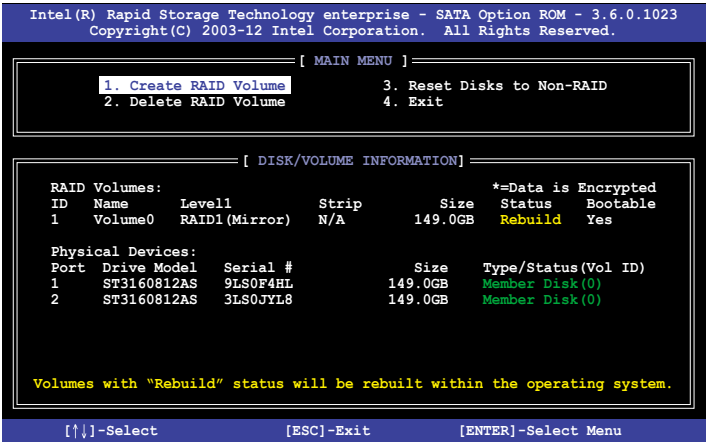
To rebuild the RAID with other non-RAID disk:

1. During POST, press <Ctrl>+<I> at the prompt to enter the Intel Rapid Storage Technology option ROM utility.
2. If there is a non-RAID SATA Hard Disk available, the utility will prompt you to rebuild the RAID. Press the up/down arrow keys to select the destination disk then Press <Enter> to start the rebuilding process or press <ESC> to exit.


[ DEGRADED VOLUME DETECTED ]
"Degraded" volume and disk available for rebuilding detected. Selectign
a disk initiates a rebuild. Rebuild completes in the operating system.
Select the port of destination disk for rebuilding (ESC to exit):
Port Drive Model Serial # Size
X XXXXXXXXXX XXXXXXX XXX.GB
[↑↓]-Previous/Next [ENTER]-Select [ESC]-Exit

Select a destination disk with the same size as the original hard disk.

3. The utility immediately starts rebuilding after the disk is selected. The status of the degraded RAID volume is changed to **"Rebuild"**.


Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.
[ MAIN MENU ]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[ DISK/VOLUME INFORMATION]
RAID Volumes:
*=Data is Encrypted
ID Name Level1 Strip Size Status Bootable
1 Volume0 RAID1(Mirror) N/A 149.0GB Rebuild Yes
Physical Devices:
Port Drive Model Serial # Size Type/Status(Vol ID)
1 ST3160812AS 9LS0F4HL 149.0GB Member Disk(0)
2 ST3160812AS 3LS0JYL8 149.0GB Member Disk(0)
Volumes with "Rebuild" status will be rebuilt within the operating system.
[↑↓]-Select
[ESC]-Exit
[ENTER]-Select Menu

4. Exit Intel Rapid Storage Technology and reboot the system.

5. Select **Start > Programs > Intel Rapid Storage > Intel Rapid Storage Console** or click the **Intel Rapid Storage Technology** tray icon to load the Intel Rapid Storage Manager utility.

6. From the **View** menu, select **Advanced Mode** to display the details of the Intel Rapid Storage Console.

7. From the **Volumes view** option, select **RAID volume** to view the rebuilding status. When finished, the status is changed to "**Normal**".

## Rebuilding the RAID with a new hard disk

If any of the SATA hard disk drives included in the RAID array failed, the system displays the status of the RAID volume as "Degraded" during POST. You may replace the disk drive and rebuild the RAID array.

To rebuild the RAID with a new hard disk:

1. Remove the failed SATA hard disk and install a new SATA hard disk of the same specification into the same SATA Port.

Select a destination disk with the same size as the original hard disk.

2. Reboot the system then follow the steps in section **Rebuilding the RAID with other non-RAID disk**.

## 6.2.6 Setting the Boot array in the BIOS Setup Utility

You can set the boot priority sequence in the BIOS for your RAID arrays when creating multi-RAID using the Intel® Rapid Storage Technology enterprise SATA Option ROM utililty.

To set the boot array in the BIOS:

Set at least one of the arrays bootable to boot from the hard disk.

1. Reboot the system and press <Del> to enter the BIOS setup utility during POST.
2. Go to the **Boot** menu and select the boot option priority.
3. Use up/down arrow keys to select the boot priority and press <Enter>. See the **Boot menu** section of Chapter 4 for more details.
4. From the **Exit** menu, select **Save Changes & Exit**, then press <Enter>.
5. When the confirmation window appears, select **Yes**, then press <Enter>.

## 6.3 Intel® Rapid Storage Technology enterprise (Windows)

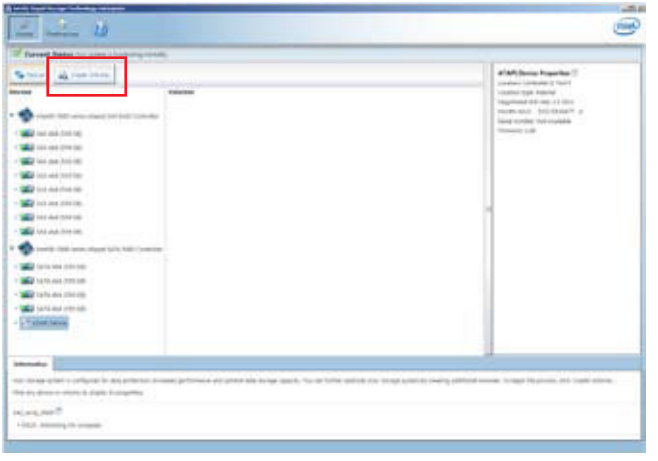
The Intel® Rapid Storage Technology enterprise allows you to create RAID 0, RAID 1, RAID 10 (RAID 1+0), and RAID 5 set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

You need to manually install the Intel® Rapid Storage Technology enterprise utility on a Windows® operating system. Please refer to the installation instructions in Chapter 6.

To enter the Intel® Rapid Storage Technology enterprise utility under Windows operating system:

1. Turn on the system to windows desktop.
2. Click the **Intel® Rapid Storage Technology enterprise** icon to display the main menu.

Your storage system is configured for data protection, increased performance and optimal data storage capacity. You can create additional volumes to further optimize your storage system.

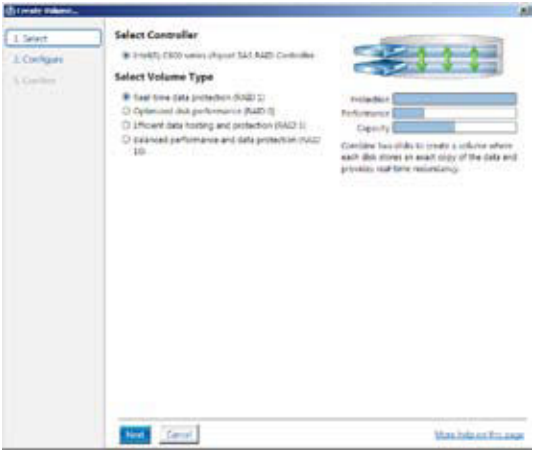


You can click **Rescan** to re-scan any attached hard disks.

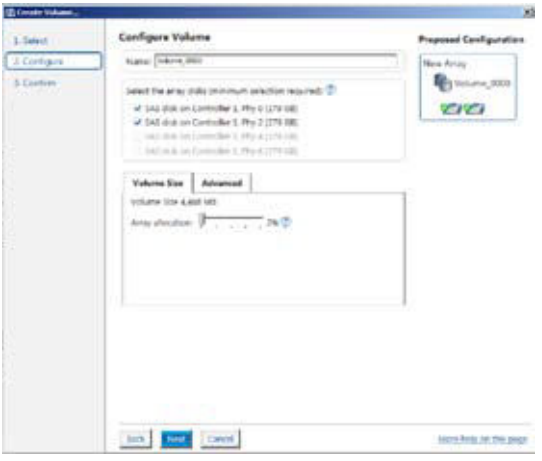
### 6.3.1 Creating a RAID set

To create a RAID set:

1. From the utility main menu, select **Create Volume** and select volume type.
2. Click **Next**.



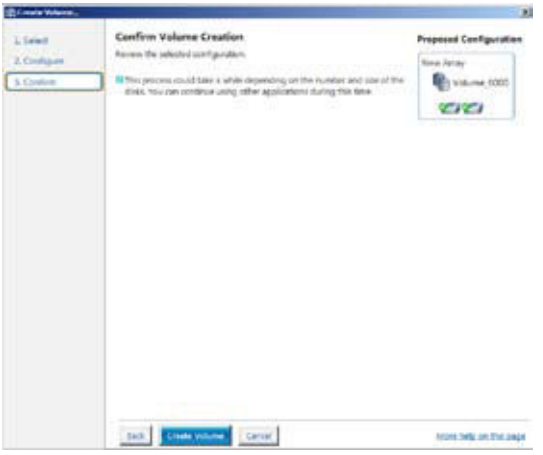

3. Enter a name for the RAID set, then select the array disks.
4. Select **Volume Size** tab, you can drag the bar to decide the volume size.
5. Click **Next**.




- If you do not want to keep the data on one of the selected disks, select **NO** when prompted.
- If you want to **Enable volume write-back cache** or **Initialize volume**, click **Advanced**.

6. Confirm the volume creation, than click **Create Volume** to continue.

This process could take a while depending on the number and size of the disks. You can continue using other applications during this time.

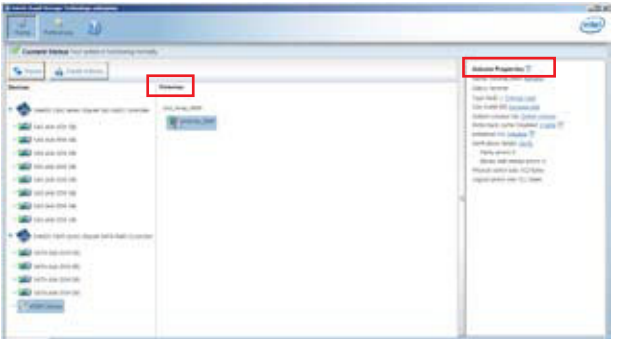



7. Wait until the process is completed, then click **OK** when prompted.

Volume Creation Complete
The volume was created successfully.
You still need to partition your new volume using Windows Disk Management before adding any data.
More help
OK

You still need to partition your new volume using Windows Disk Management before adding any data.

The RAID set is displayed in the **Volumes** list and you can change the settings in **Volume Properties**.

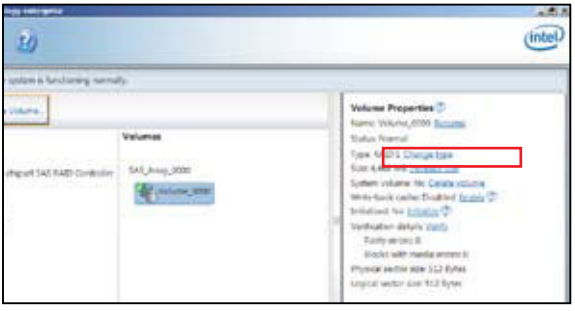


## 6.3.2 Changing a Volume Type

To change the volume type in **Volume Properties**:

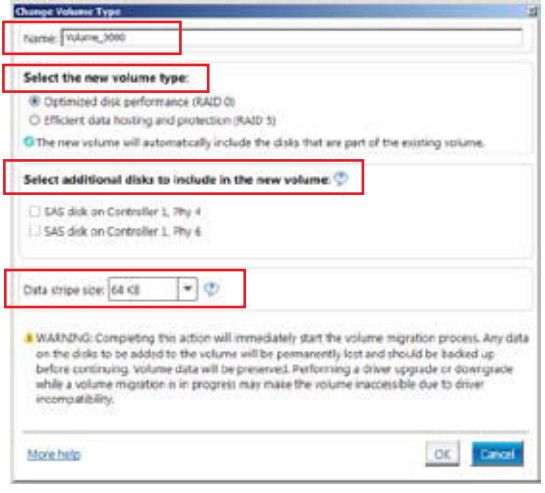
1. Click the SATA array items you want to change in **Volumes** field.

2 From the **Volume Properties** field, select **Type:RAID 1 Change type**.



3. You can change the **Name**, **Select the new volume type**, and **Select additional disks to include in the new volume** if needed.

4. Select the **Data stripe size** for the RAID array (for RAID 0, 10 and 5 only), and click **OK**. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
   RAID 0: 128KB
   RAID 10: 64KB
   RAID 5: 64KB


Change Volume Type
Name: Volume_0000
Select the new volume type:
Optimized disk performance (RAID 0)
Efficient data hosting and protection (RAID 5)
The new volume will automatically include the disks that are part of the existing volume.
Select additional disks to include in the new volume:
SAS disk on Controller 1, Phy 4
SAS disk on Controller 1, Phy 6
Data stripe size: 64 KB
WARNING: Completing this action will immediately start the volume migration process. Any data on the disks to be added to the volume will be permanently lost and should be backed up before continuing. Volume data will be preserved. Performing a driver upgrade or downgrade while a volume migration is in progress may make the volume inaccessible due to driver incompatibility.
More help
OK
Cancel

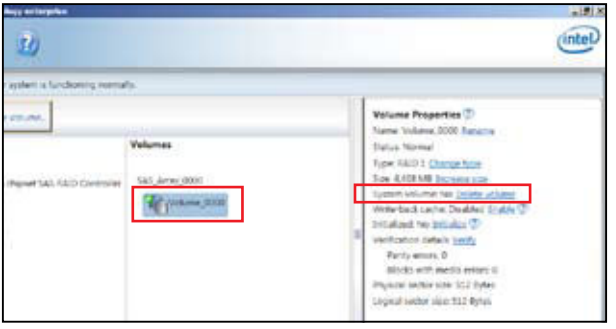
We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

### 6.3.3 Deleting a volume

Be cautious when deleting a volume. You will lose all data on the hard disk drives.Before you proceed, ensure that you back up all your important data from your hard drives.

To delete a volume:

1. From the utility main menu, select the volume (exp. Volume_0000) in **Volumes** field you want to delete.




2. Select **Delete volume** in **Volume Properties** field. The following screen appears.

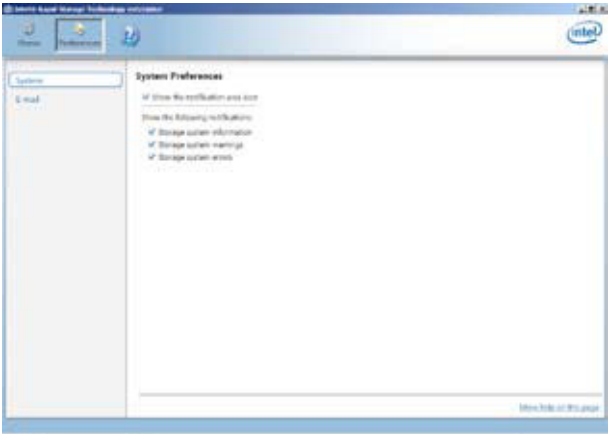
Delete Volume
Are you sure you want to delete this volume?
WARNING! Completing this action will permanently delete existing data on the selected volume. Back up data before continuing.
More help
Yes
No

3. Click **Yes** to delete the volume and return to the utility main menu, or click **No** to return to the main menu.

## 6.3.4 Preferences

### System Preferences

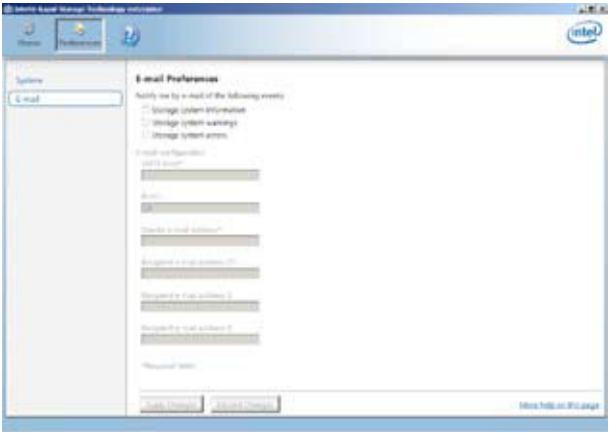
Allow you to set to show the notification area icon and show system information, warning, or errors here.



### E-Mail Preferences

Allow you to set to sent e-mail of the following events:

- Storage system information
- Storage system warnings
- Storage system errors

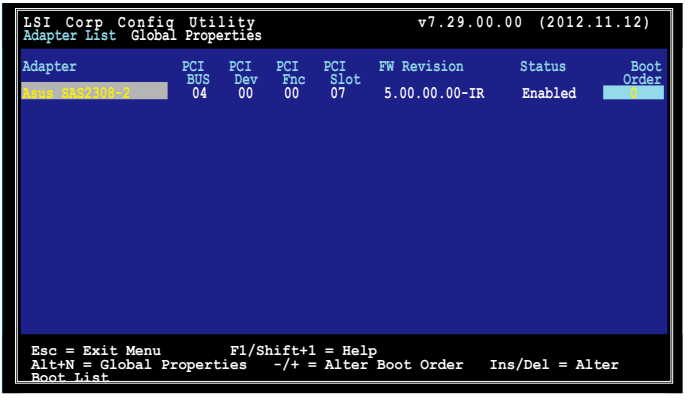


## 6.4 LSI Corporation MPT Setup Utility

The LSI Corporation MPT Setup Utility is an integrated RAID solution that allows you to create the following RAID sets from SAS hard disk drives supported by the LSI SAS 2308 Series controller: RAID 0, RAID 1, RAID 1E, and RAID 10.

- You may use disks of different sizes in one volume; however, the size of the smallest disk determines the "logical" size of each member disk.
- DO NOT combine Serial ATA and SAS disk drives in one volume.

- The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.
- The adapter name shown on the setup screens differs according to the installed SAS RAID card.
- Before requesting support from the ASUS Technical Support team, you have to take note of the MPTFW and MPTBIOS version for the SAS RAID card. After entering the SAS configuration utility, yaou can see below screen and identify the MPTFW and MPTBIOS version:
  MPTFW version: 5.00.00.00-IR
  MPTBIOS version: v7.29.00.00 (2012.11.12)


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Adapter List Global Properties
Adapter PCI BUS PCI Dev PCI Fnc PCI Slot FW Revision Status Boot Order
Asus SAS2308-2 04 00 00 07 5.00.00.00-IR Enabled 0
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Global Properties -/+ = Alter Boot Order Ins/Del = Alter Boot List

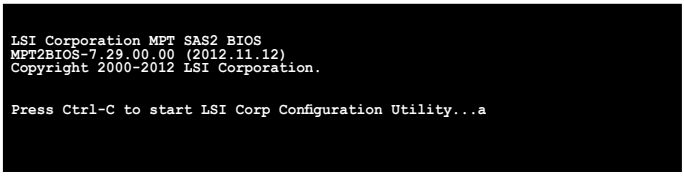
## 6.4.1 RAID 1 volume

The RAID 1 feature supports simultaneous mirrored volumes with two disks.

The RAID 1 feature supports hot swap capability, so when a disk in an RAID 1 volume fails, you can easily restore the volume, and the swapped disk is automatically re-mirrored.

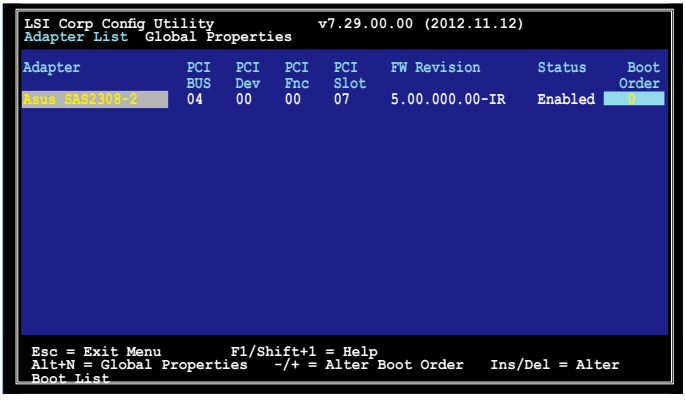
To create a RAID 1 volume:

1. Turn on the system after installing all SAS hard disk drives.
2. During POST, press <Ctrl>+<C> to enter the SAS configuration utility.


LSI Corporation MPT SAS2 BIOS
MPT2BIOS-7.29.00.00 (2012.11.12)
Copyright 2000-2012 LSI Corporation.
Press Ctrl-C to start LSI Corp Configuration Utility...a

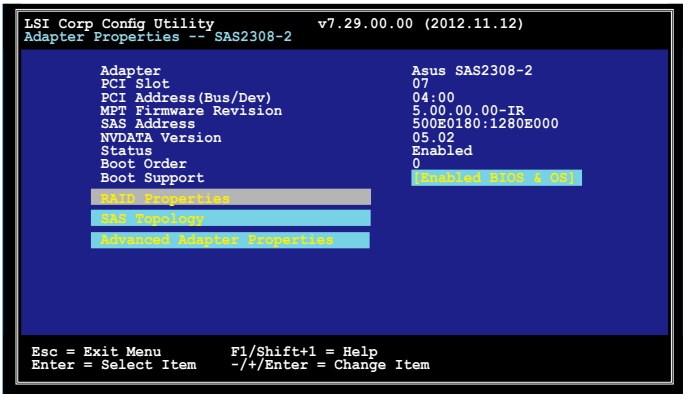
To avoid data loss, do not turn off the system when rebuilding.

3. Select a channel and press <Enter> to enter the setup.

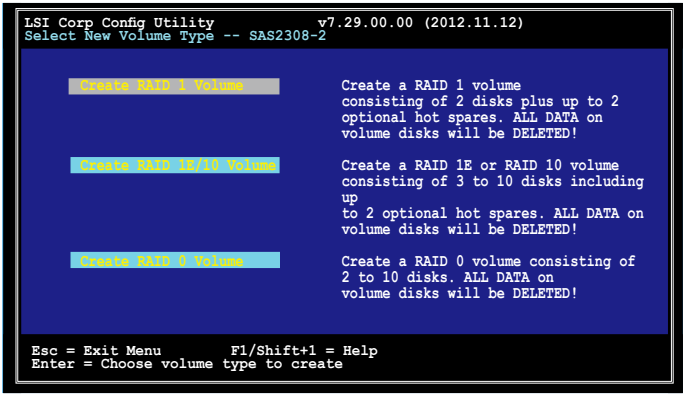

LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Adapter List Global Properties
Adapter PCI BUS PCI Dev PCI Fnc PCI Slot FW Revision Status Boot Order
Asus SAS2308-2 04 00 00 07 5.00.000.00-IR Enabled 0
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Global Properties -/+ = Alter Boot Order Ins/Del = Alter Boot List

The numbers of the channel depend on the controller.

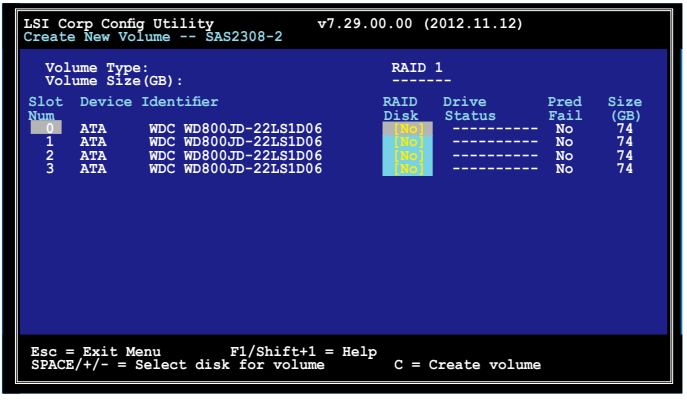
4. On the **Adapter Properties** screen, use the arrow keys to select **RAID Properties**, then press <Enter>.




5. On the **Select New Volume Type** screen, use the arrow keys to select **Create RAID 1 Volume**, then press <Enter>.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Select New Volume Type -- SAS2308-2
Create RAID 1 Volume
Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 1E/10 Volume
Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 0 Volume
Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!
Esc = Exit Menu
Enter = Choose volume type to create
F1/Shift+1 = Help

6. The **Create New Volume** screen shows the disks you can add to make up the RAID 1 volume. Use the arrow key to select a disk, then move the cursor to the **RAID Disk** column. To include this disk in the array, press <+>, <->, or <Space>.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Create New Volume -- SAS2308-2
Volume Type: RAID 1
Volume Size(GB):
Slot Num
Device Identifier
RAID Disk
Drive Status
Pred Fail
Size (GB)
0 ATA WDC WD800JD-22LS1D06 No ---------- No 74
1 ATA WDC WD800JD-22LS1D06 No ---------- No 74
2 ATA WDC WD800JD-22LS1D06 No ---------- No 74
3 ATA WDC WD800JD-22LS1D06 No ---------- No 74
Esc = Exit Menu F1/Shift+1 = Help
SPACE/+/- = Select disk for volume C = Create volume

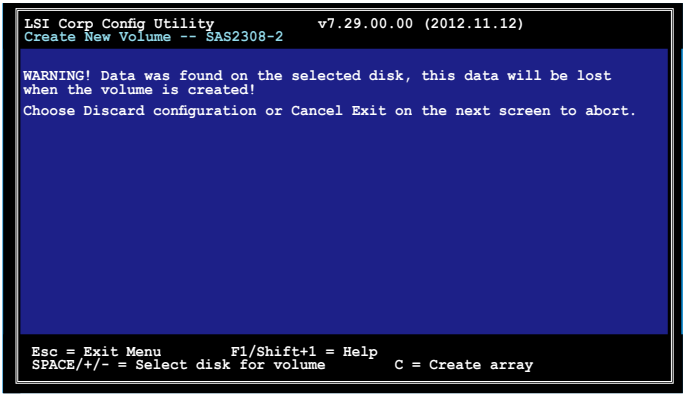
By default, the **RAID Disk** field shows **No** before volume creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID volume.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk is already part of another volume.

7. A warning screen appears. Press any key to continue.

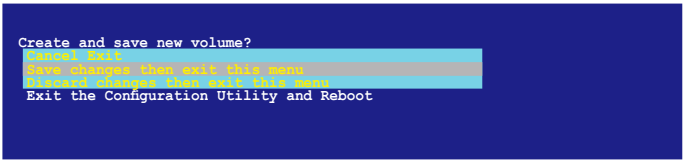
   Press <M> to keep existing data on the first disk. If you choose this option, data on the first disk will be mirrored on the second disk that you will add to the volume later. Ensure the data you want to mirror is on the first disk.

   Press <D> to overwrite any data and create the new IM array.

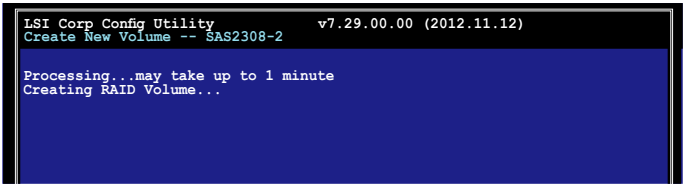

LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Create New Volume -- SAS2308-2
WARNING! Data was found on the selected disk, this data will be lost when the volume is created!
Choose Discard configuration or Cancel Exit on the next screen to abort.
Esc = Exit Menu F1/Shift+1 = Help
SPACE/+/- = Select disk for volume C = Create array

8. Repeat step 6 to add the second disk to the volume.

9. When done adding the required disks, press <C> to create the volume then select **Save changes then exit this menu**.


Create and save new volume?
Cancel Exit
Save changes then exit this menu
Discard changes then exit this menu
Exit the Configuration Utility and Reboot

10. Wait for the utility to finish creating the volume.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Create New Volume -- SAS2308-2
Processing...may take up to 1 minute
Creating RAID Volume...

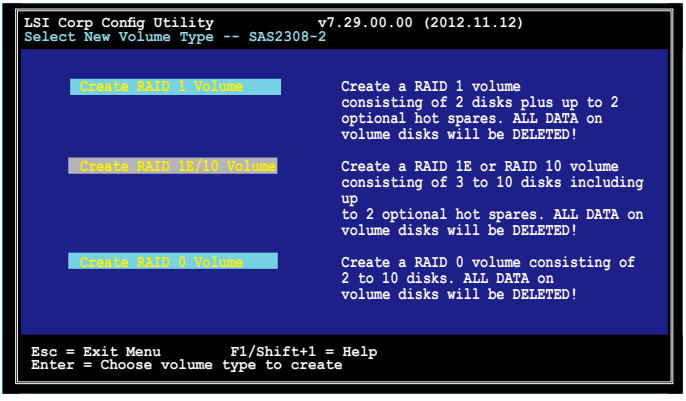
## 6.4.2 RAID 1E/10 volume

The RAID 1E/10 supports three to ten disks, or seven mirrored disks plus two hot spare disks.

Use odd numbers of hard disk drives to create a RAID 1E volume; use even numbers of hard disk drives to create a RAID 10 volume.

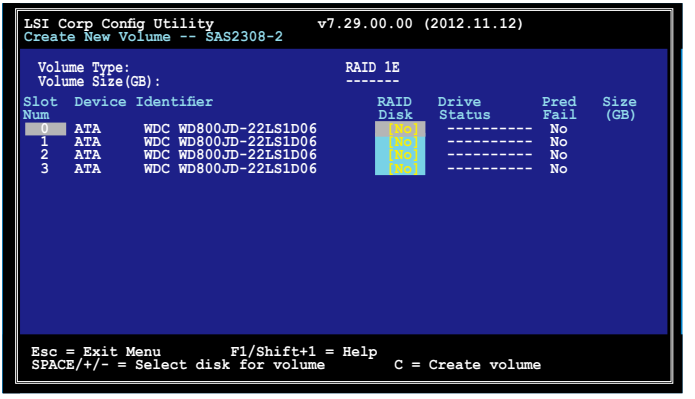
To create a RAID 1E/10 volume:

1. Follow steps 1–4 of the section **RAID 1E/10 volume**.
2. On the **Select New Volume Type** screen, use the arrow keys to select **Create RAID 1E/10 Volume** then press <Enter>.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Select New Volume Type -- SAS2308-2
Create RAID 1 Volume
Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 1E/10 Volume
Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 0 Volume
Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!
Esc = Exit Menu F1/Shift+1 = Help
Enter = Choose volume type to create

3. The **Create New Volume** screen shows the disks you can add to make up the RAID 1E/10 volume.

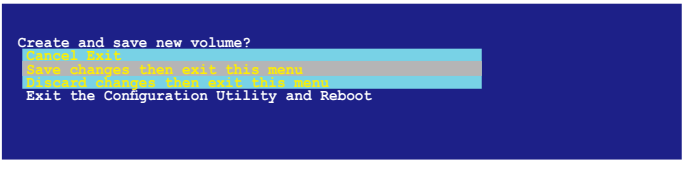
   RAID 1E/10 supports three to ten disks, or, seven mirrored disks plus two hot spare disks. Use the arrow key to select a disk, then move the cursor to the **RAID Disk** column. To include this disk in the array, press <+>, <->, or <Space>.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Create New Volume -- SAS2308-2
Volume Type: RAID 1E
Volume Size(GB):
Slot Num
Device Identifier
RAID Disk
Drive Status
Pred Fail
Size (GB)
0 ATA WDC WD800JD-22LS1D06 [No] ---------- No
1 ATA WDC WD800JD-22LS1D06 [No] ---------- No
2 ATA WDC WD800JD-22LS1D06 [No] ---------- No
3 ATA WDC WD800JD-22LS1D06 [No] ---------- No
Esc = Exit Menu
F1/Shift+1 = Help
SPACE/+/- = Select disk for volume
C = Create volume

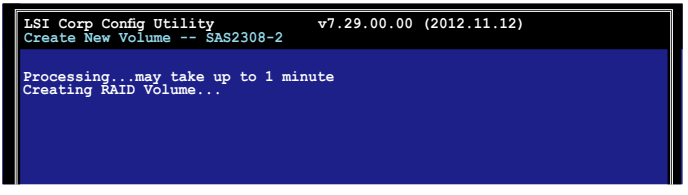
By default, the **RAID Disk** field shows **No** before volume creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID volume.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk is already part of another volume.

4. Repeat step 3 to add the other disks to the volume.
5. When done, press <C> to create the volume then select **Save changes then exit this menu**.


Create and save new volume?
Cancel Exit
Save changes then exit this menu
Discard changes then exit this menu
Exit the Configuration Utility and Reboot

6. Wait for the utility to finish creating the volume.

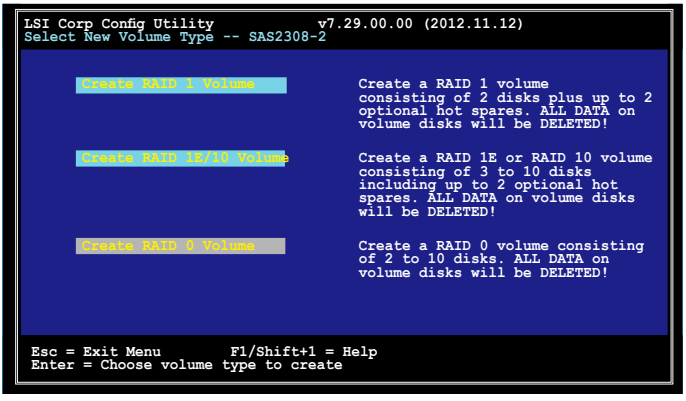

LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Create New Volume -- SAS2308-2
Processing...may take up to 1 minute
Creating RAID Volume...

## 6.4.3 RAID 0 volume

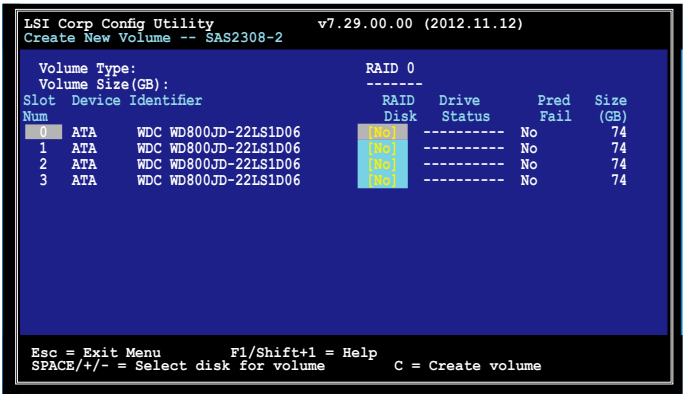
The RAID 0 feature supports volumes with two to ten disks. You may combine an RAID 0 volume with an RAID 1 or RAID 1E/10 volume.

To create a RAID 0 volume:

1. Follow steps 1–4 of the section **RAID 1 volume**.
2. On the **Select New Volume Type** screen, use the arrow keys to select **Create RAID 0 Volume**, then press <Enter>.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Select New Volume Type -- SAS2308-2
Create RAID 1 Volume
Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 1E/10 Volume
Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 0 Volume
Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!
Esc = Exit Menu F1/Shift+1 = Help
Enter = Choose volume type to create

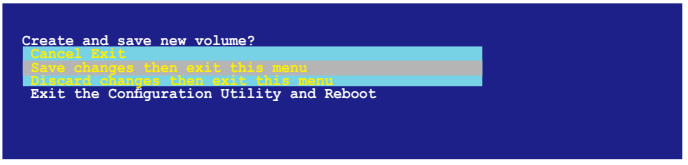
3. The **Create New Volume** screen shows the disks you can add to make up the RAID 0 volume. Use the arrow key to select a disk, then move the cursor to the **RAID Disk** column. To include this disk in the array, press <+>, <->, or <Space>.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Create New Volume -- SAS2308-2
Volume Type: RAID 0
Volume Size(GB):
Slot Num Device Identifier RAID Disk Drive Status Pred Fail Size (GB)
0 ATA WDC WD800JD-22LS1D06 [No] ---------- No 74
1 ATA WDC WD800JD-22LS1D06 [No] ---------- No 74
2 ATA WDC WD800JD-22LS1D06 [No] ---------- No 74
3 ATA WDC WD800JD-22LS1D06 [No] ---------- No 74
Esc = Exit Menu F1/Shift+1 = Help
SPACE/+/- = Select disk for volume C = Create volume

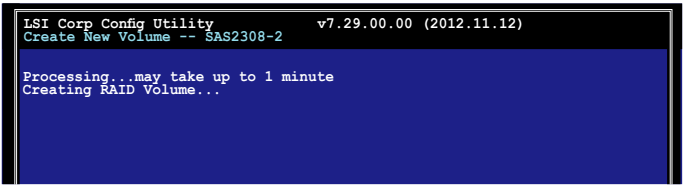
By default, the **RAID Disk** field shows **No** before volume creation. This field is grayed out under the following conditions:

- The disk does not meet the minimum requirements for use in a RAID volume.
- The disk is not large enough to mirror existing data on the primary drive.
- The disk is already part of another volume.

4. Repeat step 3 to add the other disks to the volume.
5. When done, press <C> to create the volume then select **Save changes then exit this menu**.


Create and save new volume?
Cancel Exit
Save changes then exit this menu
Discard changes then exit this menu
Exit the Configuration Utility and Reboot

6. Wait for the utility to finish creating the volume.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Create New Volume -- SAS2308-2
Processing...may take up to 1 minute
Creating RAID Volume...

## 6.4.4 Managing Arrays

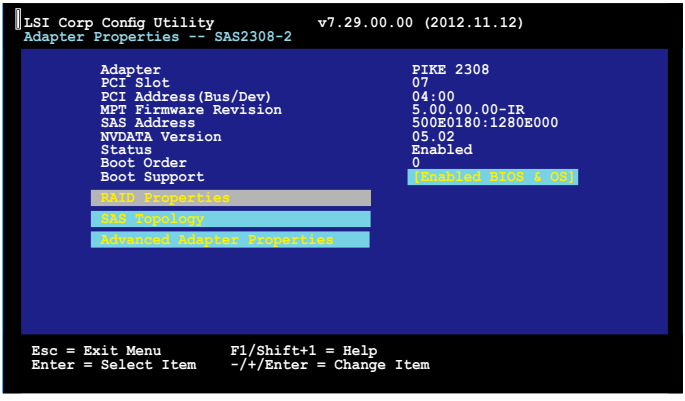
The LSI Corporation MPT Setup Utility allows you to perform other tasks related to configuring and maintaining RAID volumes.

Refer to this section to view volume properties, manage the hot spare disk, proceed with the volume consistency check, activate the volume, delete the volume, and expand the volume capacity.

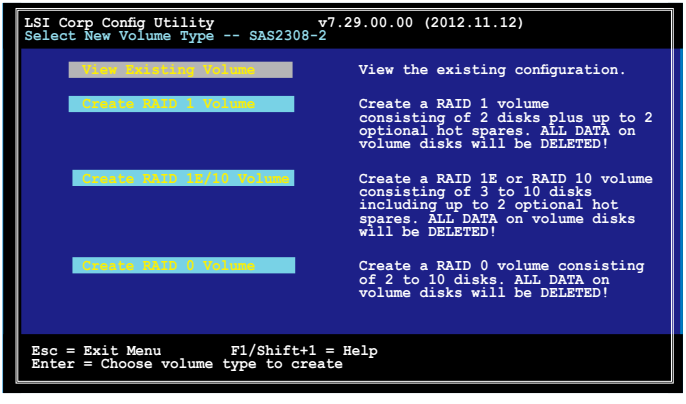
### Viewing volume properties

To view volume properties:

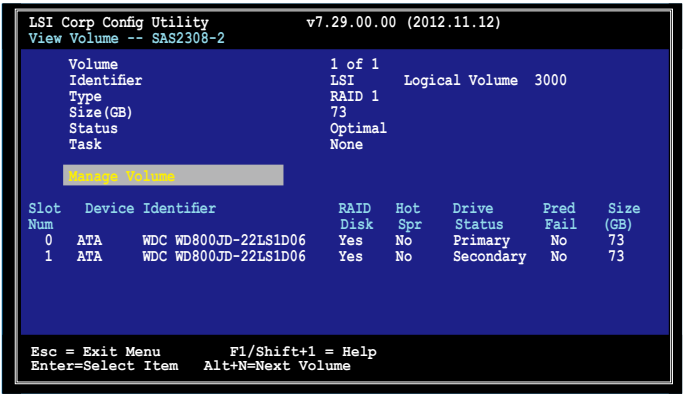
1. On the main menu, select **RAID Properties**.




2. On the next screen that appears, select **View Existing Volume**.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Select New Volume Type -- SAS2308-2
View Existing Volume
View the existing configuration.
Create RAID 1 Volume
Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 1E/10 Volume
Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 0 Volume
Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!
Esc = Exit Menu F1/Shift+1 = Help
Enter = Choose volume type to create

3. On the **View Volume** screen, you can view properties of the RAID volume(s) created. If you have configured a hot spare, it will also be listed. If you created more than one volume, you may view the next volume by pressing <Alt>+<N>.



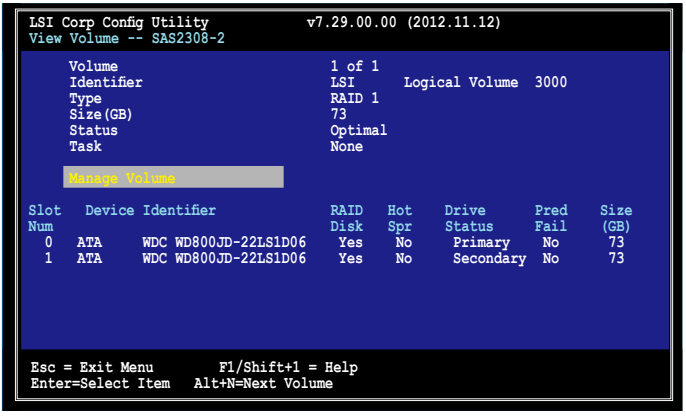
### Managing hot spares

You may configure one disk as a global hot spare to protect critical data on the RAID 1/1E/10 volume(s). You may create the hot spare disk at the same time you create the RAID 1/1E/10 volume. Refer to this section when adding a hot spare disk on an existing volume.

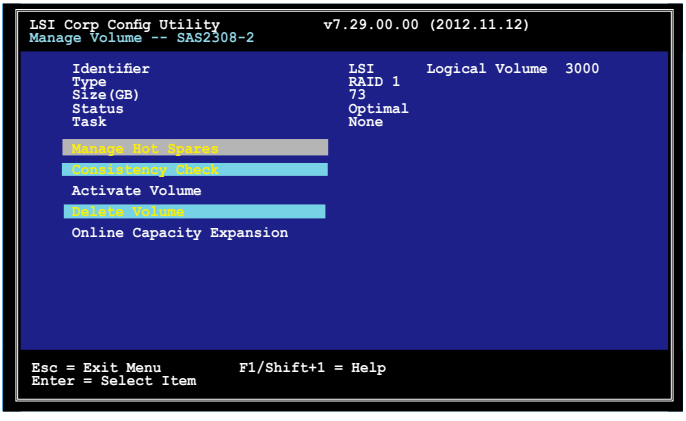
If a disk on an RAID 1/1E/10 volume fails, the utility automatically rebuilds the failed disk data on the hot spare. When the failed disk is replaced, the utility assigns the replacement as the new hot spare.

To create a hot spare:

1. Follow steps 1–3 of the section **Viewing volume properties**.
2. From the **View Volume** screen, select **Manage Volume**, then press <Enter>.

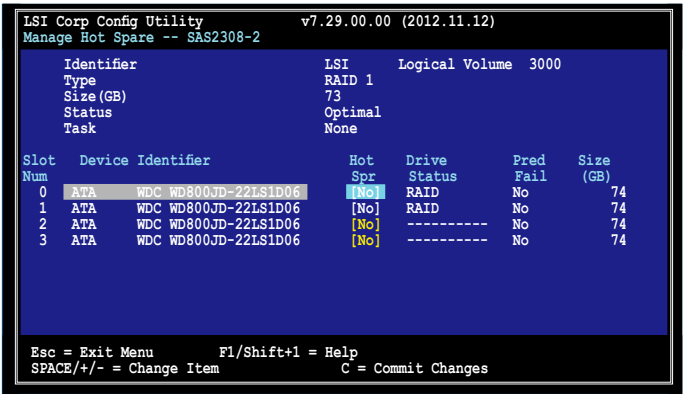

LSI Corp Config Utility v7.29.00.00 (2012.11.12)
View Volume -- SAS2308-2
Volume 1 of 1
Identifier LSI Logical Volume 3000
Type RAID 1
Size(GB) 73
Status Optimal
Task None
Manage Volume
Slot Num Device Identifier RAID Disk Hot Spr Drive Status Pred Fail Size (GB)
0 ATA WDC WD800JD-22LS1D06 Yes No Primary No 73
1 ATA WDC WD800JD-22LS1D06 Yes No Secondary No 73
Esc = Exit Menu F1/Shift+1 = Help
Enter=Select Item Alt+N=Next Volume

3. From the **Manage Volume** screen, select **Manage Hot Spares**, then press <Enter>.



4. Use the arrow key to select the disk you would like to configure as hot spare, then move the cursor to the **Hot Spr** column. Press <+>, <->, or <Space>.

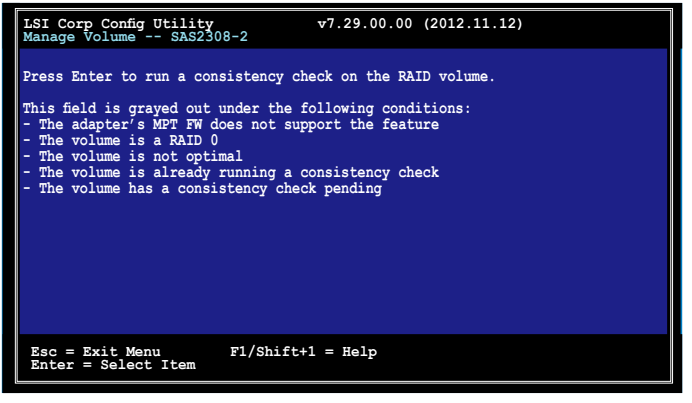
   Press <C> to commit the changes. The **Drive Status** column field now shows **Hot Spare**.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Manage Hot Spare -- SAS2308-2
Identifier LSI Logical Volume 3000
Type RAID 1
Size(GB) 73
Status Optimal
Task None
Slot Num | Device Identifier | Hot Spr | Drive Status | Pred Fail | Size (GB)
0 ATA WDC WD800JD-22LS1D06 [No] RAID No 74
1 ATA WDC WD800JD-22LS1D06 [No] RAID No 74
2 ATA WDC WD800JD-22LS1D06 [No] ---------- No 74
3 ATA WDC WD800JD-22LS1D06 [No] ---------- No 74
Esc = Exit Menu F1/Shift+1 = Help
SPACE/+/- = Change Item C = Commit Changes

Running a consistency check

To run a consistency check on the RAID volume:

1. Follow steps 1–3 of the section **Viewing volume properties** and step 2 of the section **Managing hot spares**.
2. From the **Manage Volume** screen select **Consistency Check**, then press <Enter>.
3. On the following screen, press <Enter> to start the consistency check on the RAID volume.

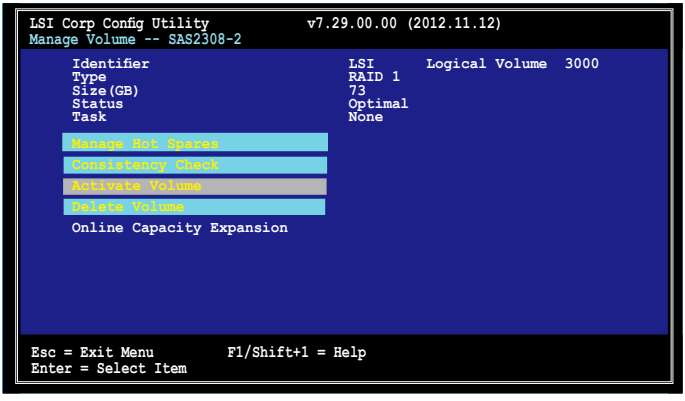

LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Manage Volume -- SAS2308-2
Press Enter to run a consistency check on the RAID volume.
This field is grayed out under the following conditions:
- The adapter's MPT FW does not support the feature
- The volume is a RAID 0
- The volume is not optimal
- The volume is already running a consistency check
- The volume has a consistency check pending
Esc = Exit Menu F1/Shift+1 = Help
Enter = Select Item

### Activating a volume

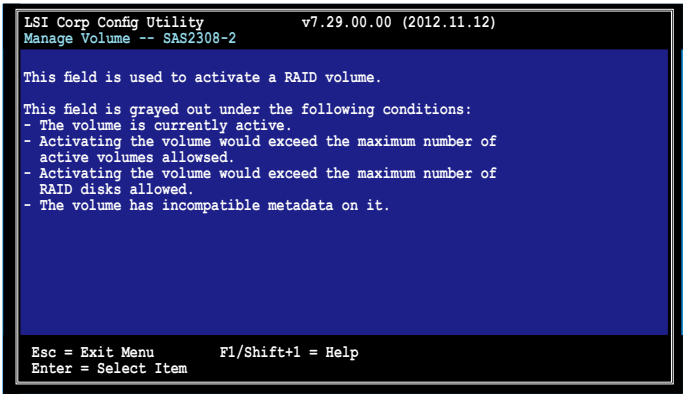
If a volume is removed from one controller/computer or moved to another, the volume is considered inactive. When you add the volume back to the system, you may reactivate the volume.

To activate the volume:

1. From the **Manage Volume** screen, select **Activate Volume**, then press <Enter>.




2. The below screen appears. Press <Enter> to activate a RAID volume.

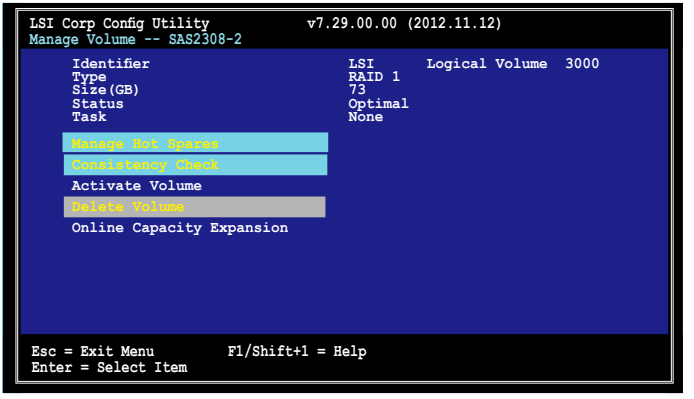

LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Manage Volume -- SAS2308-2
This field is used to activate a RAID volume.
This field is grayed out under the following conditions:
- The volume is currently active.
- Activating the volume would exceed the maximum number of active volumes allowsed.
- Activating the volume would exceed the maximum number of RAID disks allowed.
- The volume has incompatible metadata on it.
Esc = Exit Menu F1/Shift+1 = Help
Enter = Select Item

### Deleting a volume

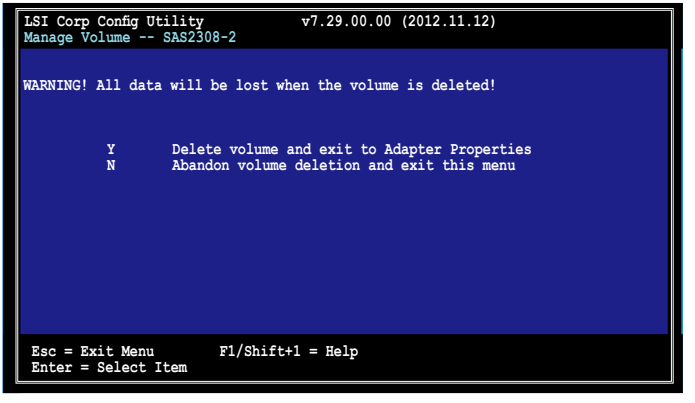
- You cannot recover lost data if you delete a volume. Ensure you back up important data before deleting a volume.
- If you delete a RAID 1 volume, the data is preserved on the primary disk.

To delete a volume:

1. From the **Manage Volume** screen, select **Delete Volume**, then press <Enter>.




2. On the following screen, press <Y> to delete, or <N> to cancel.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Manage Volume -- SAS2308-2
WARNING! All data will be lost when the volume is deleted!
Y Delete volume and exit to Adapter Properties
N Abandon volume deletion and exit this menu
Esc = Exit Menu F1/Shift+1 = Help
Enter = Select Item

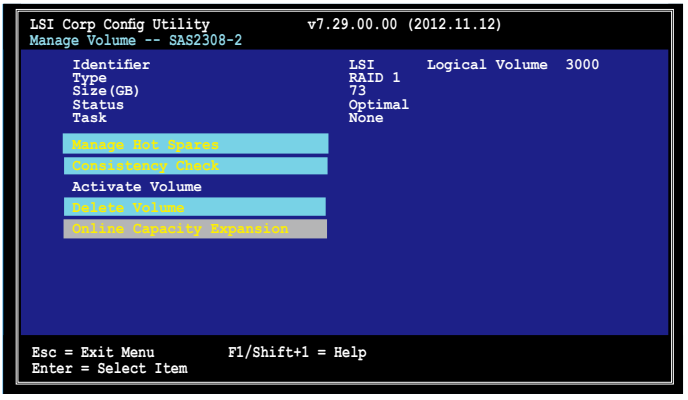
### Expanding the volume capacity

You may use two new hard disk drives to replace the existing one, and expand the capacity of the RAID volume.

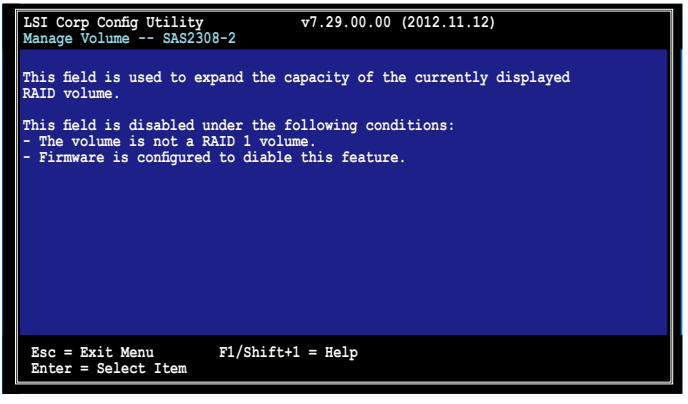
- The capactiy of th new hard disk drives should be 50GB larger than the existing one.
- This function is available only when the RAID 1 volume is optimal.

To expand the capacity of the currently displayed RAID volume:

1. From the **Manage Volume** screen, select **Online Capacity Expansion**, then press <Enter>.

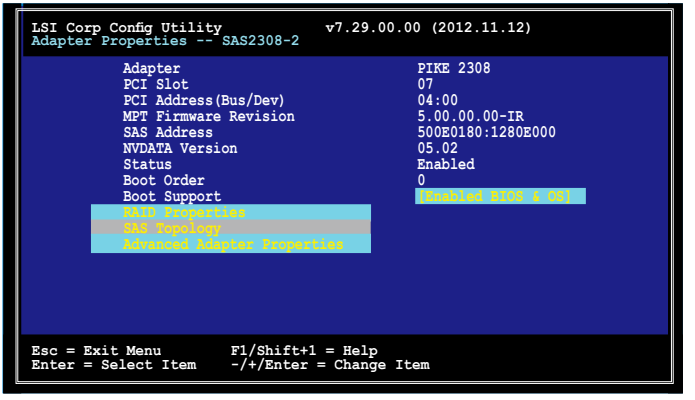



2. On the following screen, press <Enter> to proceed with the capacity expansion.

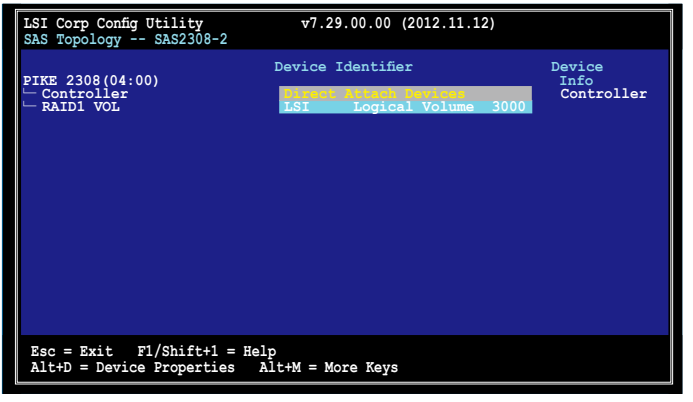

LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Manage Volume -- SAS2308-2
This field is used to expand the capacity of the currently displayed RAID volume.
This field is disabled under the following conditions:
- The volume is not a RAID 1 volume.
- Firmware is configured to diable this feature.
Esc = Exit Menu F1/Shift+1 = Help
Enter = Select Item

## 6.4.5 Viewing SAS topology

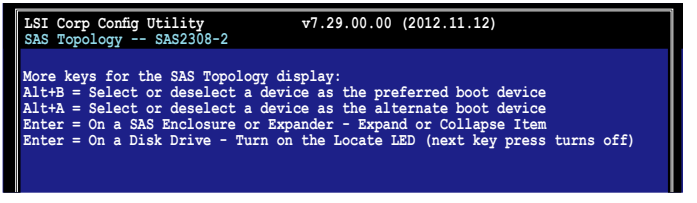
1. From the **Adapter Properties** screen, select **SAS Topology**, then press <Enter>.




2. Information about the volume and its member-disks is displayed.

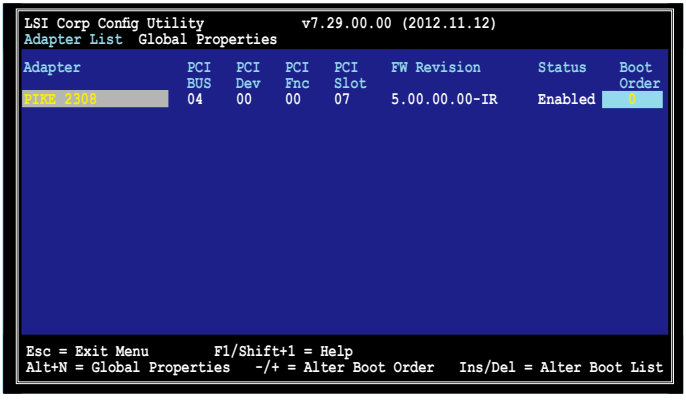



You may press <Alt>+<D> to display device properties, or <Alt>+<M> to display more keys.


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
SAS Topology -- SAS2308-2
More keys for the SAS Topology display:
Alt+B = Select or deselect a device as the preferred boot device
Alt+A = Select or deselect a device as the alternate boot device
Enter = On a SAS Enclosure or Expander - Expand or Collapse Item
Enter = On a Disk Drive - Turn on the Locate LED (next key press turns off)

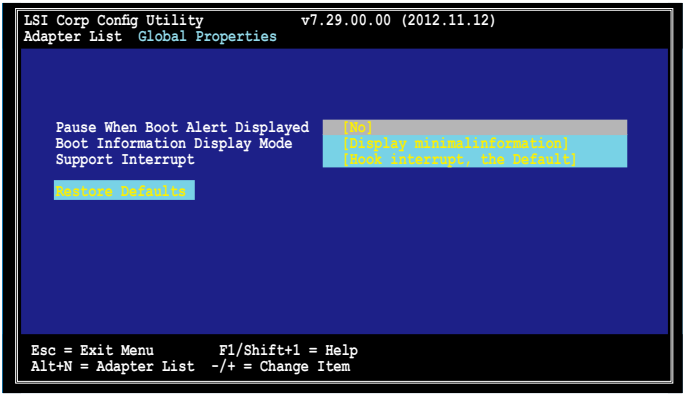
## 6.4.6 Global Properties

From the **Adapter List** screen, press <Alt>+<N> to enter **Global Properties** menu. From the menu you may change related settings.



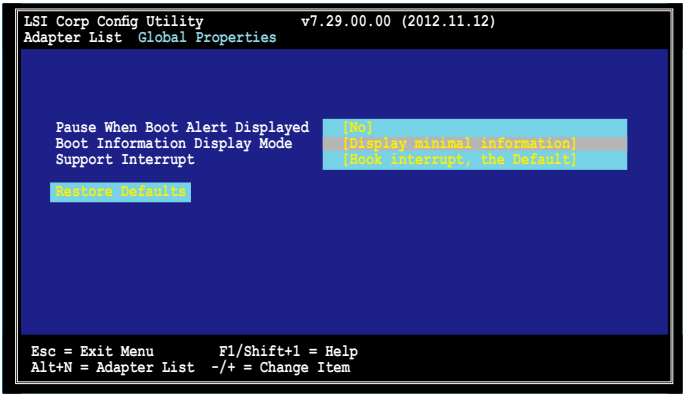

### Pause When Boot Alert Displayed

Sets whether to pause or not when the boot alert displays.
Configuration options: [Yes] [No]


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Adapter List Global Properties
Pause When Boot Alert Displayed
Boot Information Display Mode
Support Interrupt
Restore Defaults
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Adapter List -/+ = Change Item

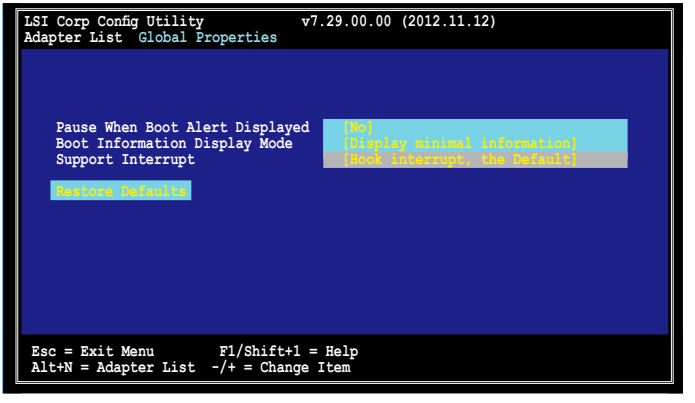
### Boot Information Display Mode

Sets the disk information display mode.
Configuration options: [Display adapters & installed devices]
[Display adapters only] [Display adapters and all devices]
[Display minimal information]


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Adapter List Global Properties
Pause When Boot Alert Displayed [No]
Boot Information Display Mode [Display minimal information]
Support Interrupt [Hook interrupt, the Default]
Restore Defaults
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Adapter List -/+ = Change Item

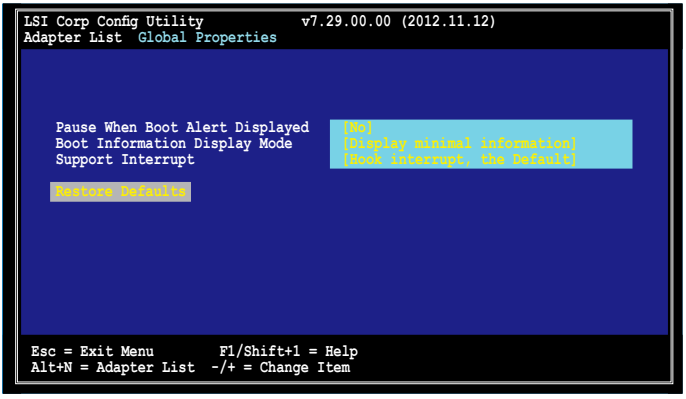
### Support Interrupt

Configuration options: [Hook interrupt, the Default] [Bypass interrupt hook]


LSI Corp Config Utility v7.29.00.00 (2012.11.12)
Adapter List Global Properties
Pause When Boot Alert Displayed [No]
Boot Information Display Mode [Display minimal information]
Support Interrupt [Hook interrupt, the Default]
Restore Defaults
Esc = Exit Menu F1/Shift+1 = Help
Alt+N = Adapter List -/+ = Change Item

### Restore Defaults

This option allows you to discard the selections you made and restore the system defaults.



# Chapter 7

This chapter provides instructions for installing the necessary drivers for different system components.

# Driver installation

## 7.1 RAID driver installation

After creating the RAID sets for your server system, you are now ready to install an operating system to the independent hard disk drive or bootable array. This part provides the instructions on how to install the RAID controller drivers during OS installation.

### 7.1.1 Creating a RAID driver disk

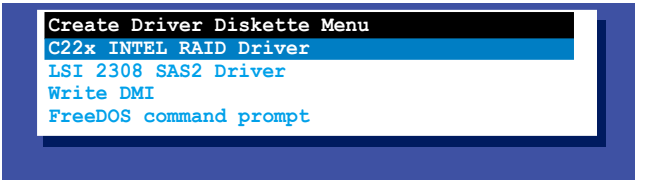
The system does not include a floppy drive. You have to use a USB floppy drive when creating a SATA RAID driver disk.

A floppy disk with the RAID driver is required when installing Windows® or Red Hat® Enterprise operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support DVD).

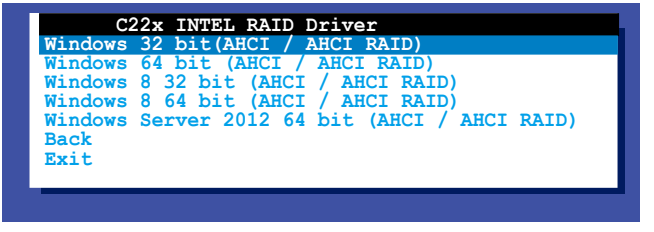
To create a RAID driver disk in DOS environment:

1. Place the motherboard support DVD in the optical drive.
2. Restart the computer. a
3. Enter the BIOS Setup.
4. Select the optical drive as the first boot priority to boot from the support DVD. Save your changes.
5. Exit the BIOS Setup and restart the computer.

   The following Makedisk menu appears.
6. Select the **C22x INTEL RAID Driver** and press <Enter> to go to the sub-menu.




7. From the C22x Intel RAID Driver sub-menu, use the Up or Down arrow keys to select the driver and press <Enter> to create the RAID driver disk.


C22x INTEL RAID Driver
Windows 32 bit(AHCI / AHCI RAID)
Windows 64 bit (AHCI / AHCI RAID)
Windows 8 32 bit (AHCI / AHCI RAID)
Windows 8 64 bit (AHCI / AHCI RAID)
Windows Server 2012 64 bit (AHCI / AHCI RAID)
Back
Exit

8. Select **YES** from the following warning message then press <Enter>.

9. On the following **Important** message, select **YES** if an ASMB7 is installed, otherwise select NO, then press <Enter>.

10. Insert the formatted diskette into the disk drive and press <Enter>. The system writes the image to the disk.

11. Press any key to continue when prompted.

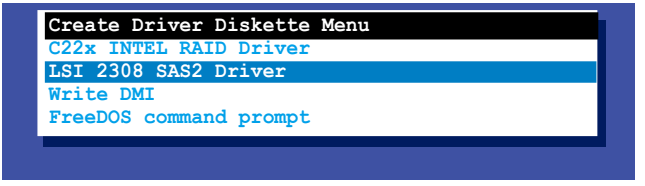
    The Create Driver Diskette Menu appears after the creation of the diskette is finished.

## 7.1.2 Creating the LSI 2308 SAS2 driver disk

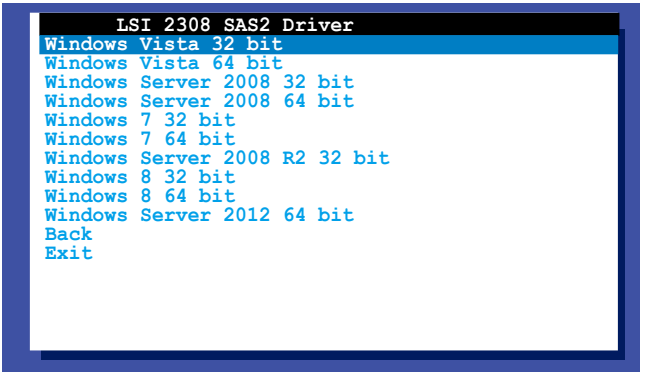
The system does not include a floppy drive. You have to use a USB floppy drive when creating a SATA RAID driver disk.

To create an LSI 2308 SAS driver disk:

1. Place the motherboard support DVD into the optical drive.
2. Restart your computer.
3. Enter the BIOS Setup.
4. Select the optical drive as the first boot priority to boot from the support DVD. Save your changes.
5. Exit the BIOS Setup and restart your computer.
6. Select **LSI 2308 SAS2 RAID Driver** on the **Create Driver Diskette** menu and press <Enter> to go to the sub-menu.

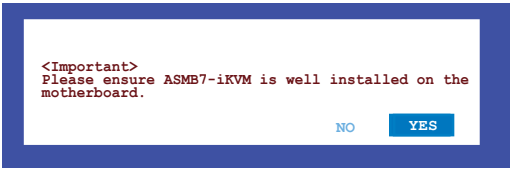



7. Use the Up or Down arrow keys in the LSI 2308 SAS2 Driver sub-menu to select the driver and press <Enter> to create the driver disk.



8. Select **YES** from the following warning message then press <Enter>.

9. On the following **Important** message, select **YES** if an ASMB7 is installed, otherwise select **NO**, then press <Enter>.




10. Insert the formatted diskette into the disk drive and press <Enter> to write the image to the disk.
11. Press any key to continue when prompted.

    The Create Driver Diskette Menu appears after the creation of the diskette is finished.

To create a RAID driver disk in Windows® environment

1. Start Windows®.
2. Place the motherboard support DVD into the optical drive.
3. Go to the **Make disk** menu, and then select the type of RAID driver disk you want to create.
4. Insert a floppy disk into the USB floppy disk drive.
5. Follow succeeding screen instructions to complete the process.

Write-protect the floppy disk to avoid computer virus infection.

To create a RAID driver disk in Red Hat® Enterprise Linux server environment

1. Insert a blank formatted high-density floppy disk to the USB floppy disk drive.
2. Type **`dd if=XXX.img of=/dev/fd0`** to decompress the file into the floppy disk from the following path in the support DVD:

   For LSI MegaRAID Driver

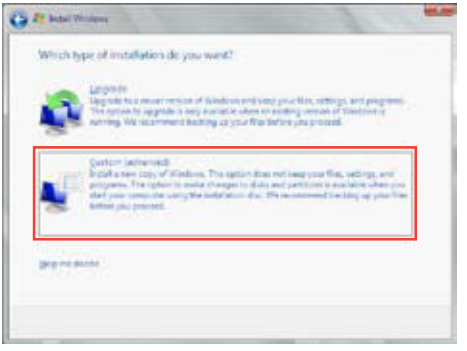
   **\Drivers\LSI 2308\Driver\Linux**
3. Eject the floppy disk.

## 7.1.3 Installing the RAID controller driver

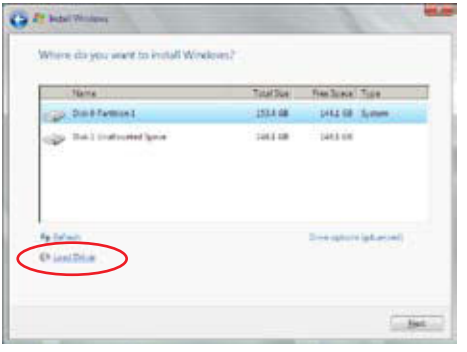
### During Windows® Server 2008 OS installation

To install the RAID controller driver when installing Windows® Server 2008 OS:

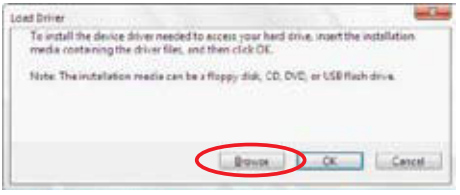
1. Boot the computer using the Windows® Server 2008 OS installation disc. Follow the screen instructions to start installing Windows Server 2008.
2. When prompted to choose a type of installation, click **Custom (advanced)**.



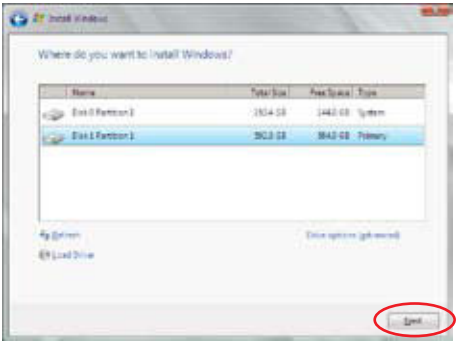
3. Click **Load Driver**.



4. A message appears reminding you to insert the installation media containing the driver of the RAID controller driver. If you have only one optical drive installed in your system, eject the Windows OS installation disc and replace with the motherboard Support DVD into the optical drive. Click **Browse** to continue.


Load Driver
To install the device driver needed to access your hard drive, insert the installation media containing the driver files, and then click OK.
Note: The installation media can be a floppy disk, CD, DVD, or USB flash drive.
Browse...
OK
Cancel

5. Locate the driver in the corresponding folder of the Support DVD, and then click **OK** to continue.
6. Select the RAID controller driver you need from the list and click **Next**.
7. When the system finishes loading the RAID driver, replace the motherboard Support DVD with the Windows Server installation disc. Select the drive to install Windows and click **Next**.




8. Follow succeeding screen instructions to continue.

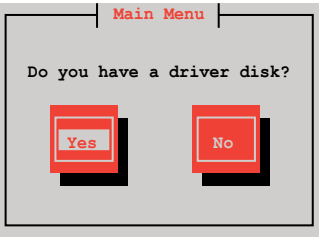
### Red Hat® Enterprise Linux OS 5.x

To load the LSI MegaRAID controller driver when installing Red Hat® Enterprise OS:

1. Boot the system from the Red Hat® OS installation CD.
2. At the **boot:**, type **linux dd** then press <Enter>.

```
-  To install or upgrade in graphical mode, press the <ENTER> key.
-  To install or upgrade in text mode, type: linux text <ENTER>.
-  Use the function keys listed below for more information.
[F1-Main] [F2-Options] [F3-General] [F4-Kernel] [F5-Rescue]
boot: linux dd
```

3. Select **Yes** using the <Tab> key when asked if you have a driver disk, then press <Enter>.

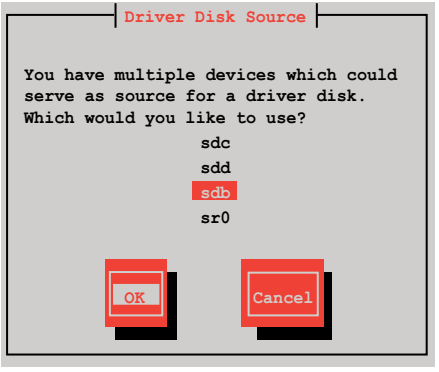



4. Insert the Red Hat® Enterprise RAID driver disk into the USB floppy disk drive.

Write-protect the floppy disk to avoid computer virus infection.

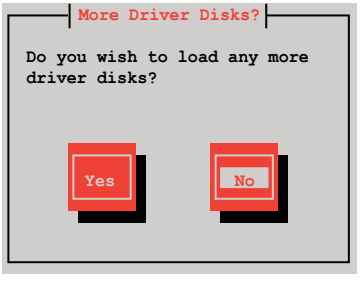
If the Red Hat® Enterprise RAID driver is stored in a USB flash drive, insert the USB flash drive into an available USB port.

5 . Choose a source for the driver disk, select **OK**, then press <Enter>.




The drivers for the RAID card are installed to the system.

6. Select **No** when asked to load additional RAID controller drivers then press <Enter>.




7. Follow onscreen instructions to finish the OS installation.

### Red Hat® Enterprise Linux OS 6.x

To install the LSI MegaRAID controller driver when installing Red Hat® Enterprise OS:

1. Boot the system from the Red Hat® OS installation CD.

Welcome to Red Hat Enterprise Linux 6.1!
Install or upgrade an existing system
Install system with basic video driver
Rescue installed system
Boot from local drive
Memory test
Press [Tab] to edit options

3. While booting from DVD, press <ESC> to provide the third party driver. Enter the following command at the boot: **`Linux dd`** then press <ENTER>.

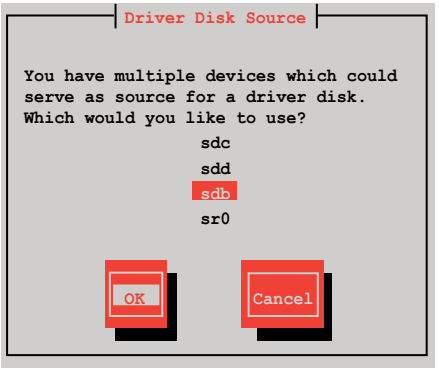
Welcome to Red Hat Enterprise Linux 6.1!
Install or upgrade an existing system
Install system with basic video driver
Rescue installed system
Boot from local drive
Memory test
> vmlinuz initrd=linux dd
RED HAT
ENTERPRISE LINUX 6

4. Insert the Red Hat® Enterprise RAID driver disk into the USB floppy disk drive.

Write-protect the floppy disk to avoid computer virus infection.

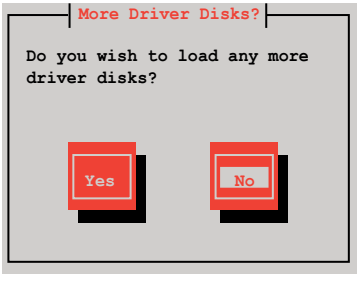
If the Red Hat® Enterprise RAID driver is stored in a USB flash drive, insert the USB flash drive into an available USB port.

5 . Choose a source for the driver disk, select **OK**, then press <Enter>.




The drivers for the RAID card are installed to the system.

6. Select **No** when asked to load additional RAID controller drivers then press <Enter>.




7. Follow onscreen instructions to finish the OS installation.

### Preparing the Linux Driver

Ensure that there is another computer with a Linux-based OS to create the RAID driver. When creating the RAID driver, you may refer to the examples below which uses a 64bit SUSE Linux system to create a 64bit RAID driver for SUSE11 sp1.

1. Copy the image file into the Linux system.

   Example: **`megasr-15.00.0120.2012-1-sles11-ga-x86_64.img`**

2. Create a folder.

   Example: **`image`**

3. Mount the image file into the image folder using this command format:

   **`mount -oloop [image file name] image`**

   Example: **`mount -oloop megasr-15-15.00.0120.2012-1-sles11-ga-x86__64.img image`**

4. Copy the contents of the image directory, labeled as **01**, into a FAT32 USB drive.

5. Rename the **01** folder to **CD Image**.

### Installing SUSE 11 Linux OS

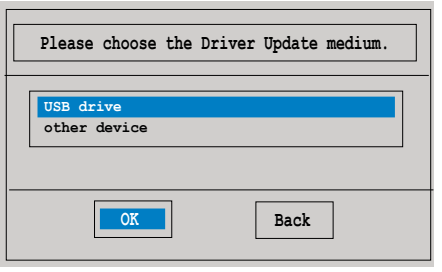
To install the LSI MegaRAID controller driver when installing SUSE Linux Enterprise Server OS:

1. Boot the system from the SUSE OS installation CD.
2. Use the arrow keys to select **Installation** from the **Boot Options** menu.

3. Use the USB drive to provide the third-party driver during the OS installation.

   Press <F6>, select **Yes** from the menu, then press <Enter>.

4. On the following screen, select **USB drive** as the driver update medium, select **OK**, then press <Enter>.




5. Select **Back** and follow the onscreen instructions to finish the installation.

## 7.2 Management applications and utilities installation

The support DVD that is bundled with your motherboard contains drivers, management applications, and utilities that you can install to maximize the features of your motherboard.

1. The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for the latest updates on software and utilities.
2. The support DVD is supported on Windows® Server 2008 R2 and Windows® Server 2012.

## 7.3 Running the Support DVD

When you place the support DVD into the optical drive, the DVD automatically displays the main screen if Autorun is enabled in your computer. By default, the Drivers tab is displayed.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

The main screen of the Support DVD contains the following tabs:

1. Drivers
2. Utilities
3. MakeDisk
4. Manual
5. Contact

The main screen of the Support DVD looks exactly the same on the Windows® Server 2008 R2 and on the Windows® Server 2012 Operating System (OS).

### 7.3.1 Drivers menu tab

The Drivers Menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.

ASUS InstAll - Drivers Installation Wizard
Intel Chipset Device Software
Intel Network Connection Software
Broadcom NetXtreme II GigE Driver
ASPEED AST2300 / AST1300 Display Dr...
Intel C22x MEI NULE HECI Driver
INTEL USB 3.0 eXtensible Host Controlle...
Intel I210 Gigabit Adapters Driver
Intel(R) C220 series chipset SATA AHCI ...
LSI SAS2308 W2K8_R2_x64 Driver

### 7.3.2 Utilities menu tab

The Utilities menu displays the software applications and utilities that the motherboard supports.

ASUS InstAll - Installation Wizard for SAS...
Broadcom Advanced Control Suite 4 (BACS 4)
Broadcom BACS command line interface ...
Intel Rapid Storage Technology enterprise...
Microsoft Visual C++ 2005 Redistributable...
LSI MegaRAID Storage Manager
ASUS Update
ASUS Screen Saver
Adobe Reader X 10.1.4.38

### 7.3.3 MakeDisk menu tab

The MakeDisk menu contains items to create the Intel RAID driver disks.

Press the arrow down button in the lower part of the menu to view more items.

### 7.3.4 Manual menu

The Manual menu provides the link to the Broadcom NetXtreme II Network Adapter user guide.

You need an internet browser installed in your OS to view the User Guide.

### 7.3.5 Contact information menu

The Contact menu displays the ASUS contact information, e-mail addresses, and useful links if you need more information or technical support for your motherboard.

### 7.3.6 Installing the Intel® Chipset device Software driver

This section provides the instructions on how to install the Intel® chipset device software on the system.

You need to manually install the Intel® chipset device software on a Windows® Operating System.

To install the Intel® chipset device software on Windows® Server 2008 R2:

1. Restart the computer.
2. Log in with **Administrator** privileges.
3. Insert the Motherboard Support DVD to the optical drive.

   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® Chipset Device Software** from the Drivers menu to start the installation.

5. From the **Intel® Chipset Device Software,** click **Next** to start the installation.

6. In the **License Agreement** window, click **Yes** to continue**.**

7. Read the Readme File information and click **Next** to continue.

8. Click **Install** in the **Windows Security** window.

The Windows Security window may appear more than once and you may have to click **Install** several times to continue with the installation.

9. When finished, click **Next.**

10. When prompted to restart the computer, select **Yes, I want to restart this computer now** then click **Finish** to complete the installation.

To install the Intel® Chipset device software on Windows® Server 2012:

1. Restart the computer.
2. Log in with **Administrator** privileges.
3. Insert the Motherboard Support DVD to the optical drive.

   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® Chipset Device Software** from the Drivers menu to start the installation.

5. From the **Intel® Chipset Device Software**, click **Next.**

6. In the **License Agreement** window, click **Yes** to continue the process**.**

7. Read the Readme File information and click **Next** to continue.

8. When done, click **Finish** to complete the installation.

## 7.4 Installing the LAN driver

This section provides the instructions on how to install the **Intel® Network Connections Software** drivers on the system.

You need to manually install the LAN controller driver on a Windows® operating system.

To install the **LAN** controller device on Windows® Server 2008 R2:

1. Restart the computer.
2. Log in with A**dministrator** privileges.
3. Insert the Motherboard Support DVD to the optical drive.

   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

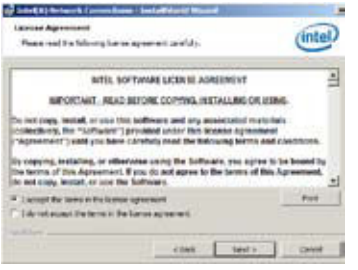
If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® Network Connections Software** on the **Drivers menu** to start the installation.

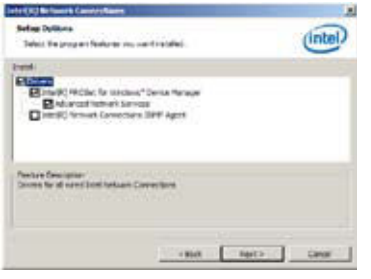
5. From the **Intel® Network Connections** window, click **Install Drivers and Software**.

6. Click Next in the Welcome to the InstallShield Wizard for Intel(R) Network Connections.

7. From the **License Agreement** window, select **I accept the terms in the license agreement** then click **Next.**

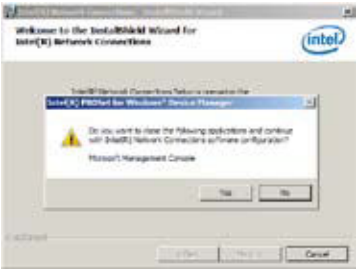


8. Select the drivers you want to install in the **Setup Options** window and click **Next**.



9. From the **Ready to Install the Program** window, click **Install.**

10. Click **Yes** when the **Microsoft Management Console** dialog box appears**.**



The **Microsoft Management Console** dialog box appears when the system detects open or running applications that needs to be closed. You have to terminate open or running applications specified in the dialog box to proceed with the installation.

11. When done, click **Finish** to complete the installation.

To install the **LAN** controller device on Windows® Server 2012:

1. Restart the computer.
2. Log in with A**dministrator** privileges.
3. Insert the Motherboard Support DVD to the optical drive.

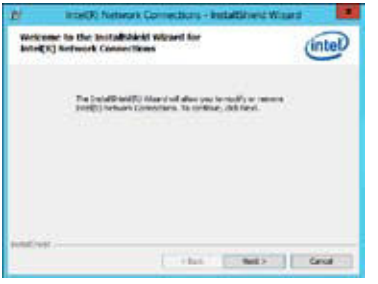
   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

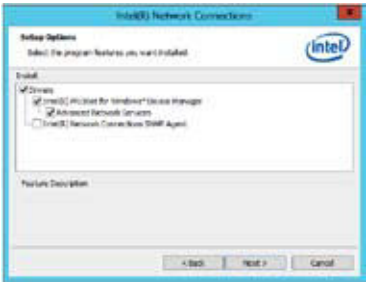
4. Click **Intel® Network Connections Software** on the **Drivers menu** to start the installation.

5. From the **Intel® Network Connections** window, click **Install Drivers and Software**.

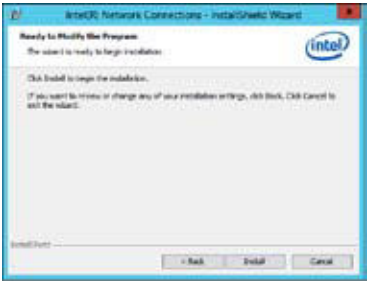
6. Click Next in the **Welcome to the InstallShield Wizard for Intel(R) Network Connections** window.



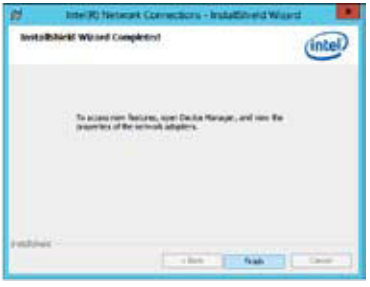
7. Select the drivers you want to install in the **Setup Options** window and click **Next**.



8. Click **Install** to continue.



9. When done, click **Finish** to complete the installation.



## 7.5 Installing the VGA driver

This section provides the instructions on how to install the **ASPEED Video Graphics Adapter (VGA)** driver.

To install the **ASPEED VGA** driver on Windows® Server 2008 R2:

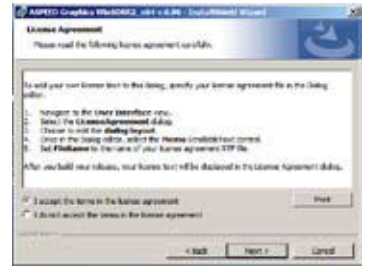
1. Restart the computer.
2. Log in with A**dministrator** privileges.
3. Insert the Motherboard Support DVD to the optical drive.

   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

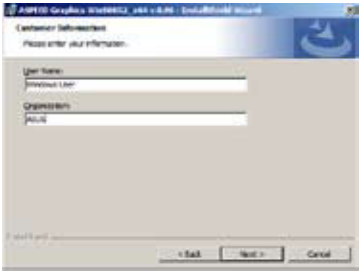
If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. From the **Main Menu**, click **ASPEED AST2300/AST1300 Display Driver** on the **Drivers** tab to start the installation.

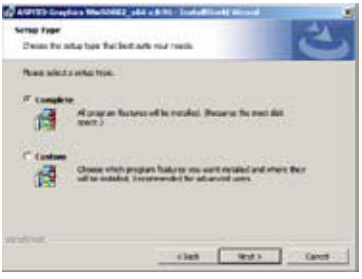
5. From the **License Agreement** window, select **I accept the terms** and click **Nex**t..



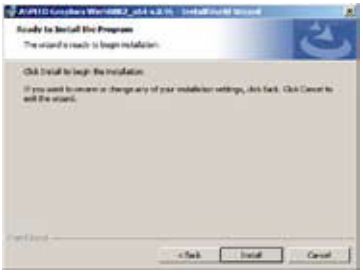
6. Key in a username and organization then click **Next**.



7. Select **Complete** in the **Setup Type window** then click **Next**.



8. Click **Install** to begin the installation.



9. When done, click **Finish**.

10. When prompted to restart the computer, click **Yes**.

To install the **ASPEED VGA** driver on Windows® Server 2012:

1. Restart the computer.
2. Log in with A**dministrator** privileges.
3. Insert the Motherboard Support DVD to the optical drive.

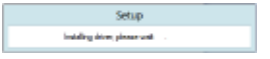
   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **ASPEED AST2300/AST1300 Display Driver** on the **Drivers** menu to start the installation.

5. Click **OK** in the Driver Information window.

   Wait for the loading of drivers to finish.




6. Click **OK** to complete the installation.

## 7.6 Installing the Intel® C22x MEI NULL HECI driver

This section provides the instructions on how to install the Intel® C22x MEI NULL HECI driver on the motherboard.

To install the **Intel® C22x MEI NULL HECI** driver in Windows:

1. Restart the computer.
2. Log in with **Administrator** privileges.
3. Insert the motherboard/system support DVD to the optical drive.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® C22x MEI NULL HECI** on the **Drivers** menu of the main screen to start the installation.

5. From the **Welcome to the Setup Program** window, click **Next.**

6. Click **Yes** in the **License Agreement** window to continue with the installation.

7. Click **NEXT** when the installation of driver is complete.

8. Click **Finish** to complete the installation.

## 7.7 Installing the Intel® I210 Gigabit Adapter driver

This section provides the instructions on how to install the **Intel® I210 Gigabit Adapter** driver on the system.

To install the **Intel® I210 Gigabit Adapter** driver on Windows® Server 2008 R2:

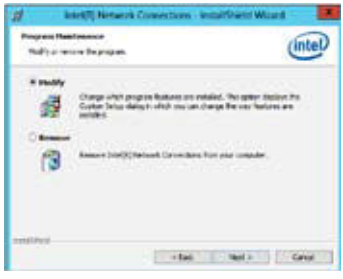
1. Restart the computer.
2. Log on with **Administrator** privileges.
3. Insert the motherboard/system support DVD to the optical drive.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

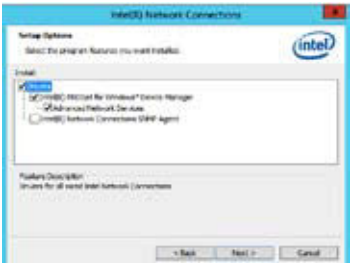
4. Click **Intel I210 Gigabit Adapter Driver** in the **Drivers** menu of the main screen to start the installation.

5. Click **Next** to continue.

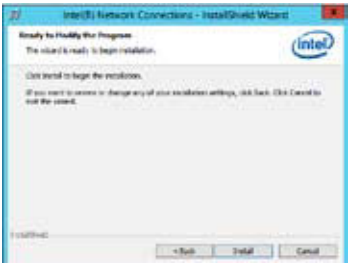
6. From the **Program Maintenance** window, select **Modify** then click **Next.**



7. Select the options you want to install then click **Next** to continue.



8. Click **Install** in the **Ready to Modify the Program** window to begin with the loading of the selected options.



9. When done, click **Finish**.

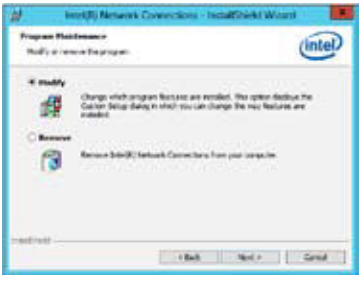
To install the **Intel® I210 Gigabit Adapter** driver on Windows® Server 2012:

1. Restart the computer.
2. Log on with **Administrator** privileges.

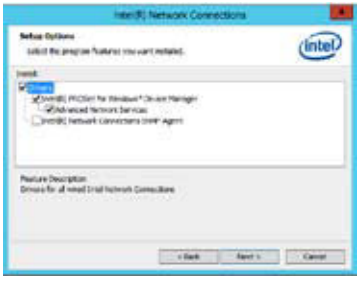
If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® I210 Gigabit Adapter Driver** in the **Drivers** menu of the main screen to start the installation.
5. Click **Next** to continue.

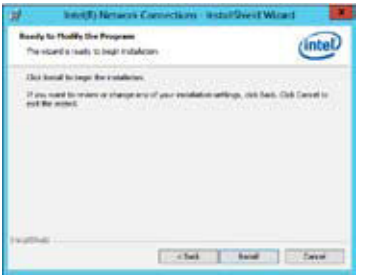
6. From the **Program Maintenance** window, select **Modify** then click **Next.**



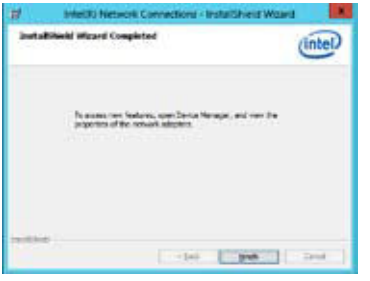
7. Select the options you want to install then click **Next** to continue.



8. In the **Ready to Modify the Program** window, click **Install** to load the options you selected.



9. When done, click **Finish**.

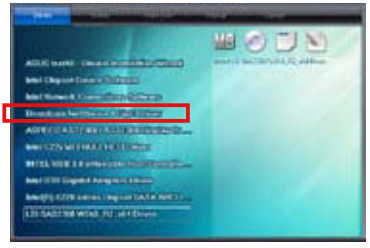


## 7.8 Installing the Broadcom 10G driver

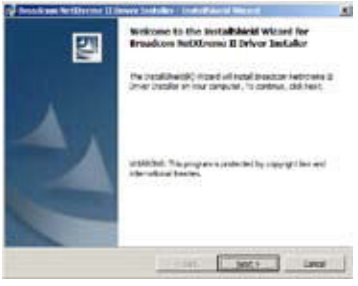
This section provides instructions on how to install the **Broadcom 10G** driver on the system. You have to manually locate the driver for the Broadcom 10G in the support DVD provided.

To install the **Broadcom 10G** driver:

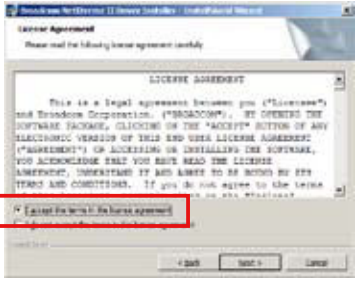
1. Restart the computer.
2. Log on with **Administrator** privileges.
3. Insert the motherboard/system support DVD into the optical drive.
4. Click the **Broadcom NetXtreme II GigE Driver** to begin installation.



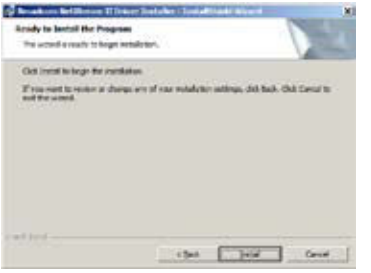
5. From the **Broadcom NetXtreme II Driver Installer** window, click **Next.**



6. From the **License Agreement** window, select **I accept the terms in the license agreement** then click **Next.**



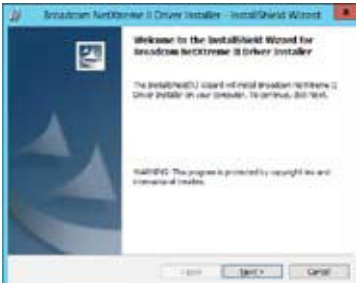
7. Click **Install** to start installing the drivers.



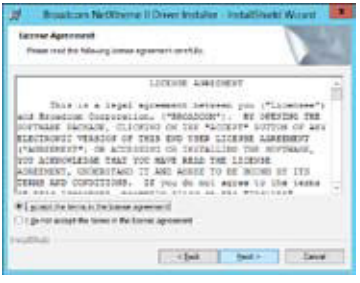
8. When done, click **Finish.**

To install the **Broadcom 10G** driver in Windows Server 2012:

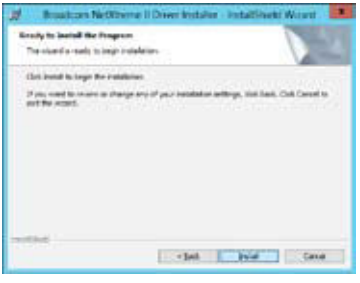
1. Restart the computer.
2. Log on with **Administrator** privileges.
3. Insert the motherboard/system support DVD into the optical drive.
4. Click the **Broadcom NetXtreme II GigE Driver** to begin installation.
5. From the **Broadcom NetXtreme II Driver Installer** window, click **Next.**



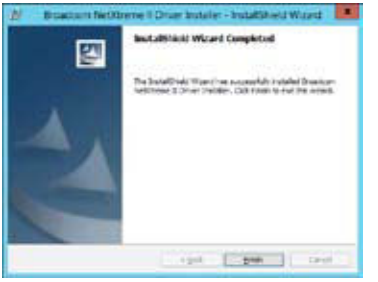
6. From the **License Agreement** window, select **I accept the terms in the license agreement** then click **Next.**



7. Click **Install** to start installing the drivers.



8. When done, click **Finish.**



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